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ABSTRACT

This document includes abstracts of 350 experiments in instructional television and instructional film since 1950. Each abstract describes the problem, sample, subject taught, key variables, and criterion instruments. Reliability and validity data, and statistics, when available, are also given. The introduction reviews research trends, author and subject indexes are also included. This document was originally published as ED 015 673. (Author)

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RESEARCH IN INSTRUCTIONAL TELEVISION AND FILM

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OE-34041

RESEARCH IN INSTRUCTIONAL TELEVISION AND FILM

Summaries of Studies

by
J. Christopher Reid and
Donald W. MacLennan

University of Missouri

Introduction

by
Leslie P. Greenhill

The Pennsylvania State University

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
John W. Gardner, Secretary

OFFICE OF EDUCATION/Harold Howe II, Commissioner

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FOREWORD

THE OFFICE of Education is pleased to make available this report of almost 350 research studies concerned with instructional television and film. The summaries were prepared by the authors and have been categorized for easy reference and use by researchers, school administrators, curriculum directors, classroom teachers, and media specialists.

Acknowledgment is made to Dr. Wilbur Schramm for his foresight in suggesting the value of such a publication and for encouraging the authors to proceed with the study. The valuable contribution by Leslie P. Greenhill, The Pennsylvania State University, in his introduction is also gratefully acknowledged.

GERTRUDE G. BRODERICK
Educational Media Specialist

PREFACE

IN RESPONSE to a suggestion made by Wilbur Schramm, we undertook to abstract the experimental literature on instructional television and instructional film research since 1950.

We decided not to include historical or descriptive studies, and reports of surveys, surveys of research, and other nonexperimental reports. Some studies were made available in abstract form only. Whenever possible the original work was used but when not available, abstracts which appeared reasonably complete were included. Studies which used television or film for noninstructional purposes, such as personality experiments, were omitted from this collection.

Each article is presented as objectively as possible but without comment on design, statistics, or stated conclusions. If any bias appears, it is unintentional. Generally our goal has been to present a useful abstract by including the number and description of subjects, criterion instruments, reliability and validity data, and statistics used so that the reader may draw his own conclusion. Some studies overlooked reliability or other data that we should have liked to include in the abstract, and in a few instances the article was unclear.

All completed abstracts (except abstracts of dissertations) were mailed to investigators when they could be located, for comments before the final typing. We appreciate the comments that many investigators made. If errors still remain, we apologize for them.

Articles published in the *Audio-Visual Communication Review*, the USOE Title VII studies, dissertations, and various booklets, mimeographed, duplicated, and offset materials were prepared by Mr. Reid. All dissertations, unless noted otherwise, were prepared from *Dissertation Abstracts*. Mr. MacLennan abstracted articles from the Armed Forces studies and from all other journals and periodicals.

In some instances the investigators drew attention to missing works, some of which were located and added. This has been a cooperative project, and we are grateful for the help we have received.

We are grateful especially to Dr. Schramm for his procedural suggestions and his continual help and encouragement. To him belongs much of the credit, but none of the blame, for the study.

J. CHRISTOPHER REID
DONALD W. MACLENNAN

CONTENTS

Page

Foreword iii

Preface v

Review of Trends in Research on Instructional Television and Film 1

- Introduction 1
- Comparisons of Televised Instruction With Direct Instruction 2
- Comparisons of Filmed or Kinescoped Courses With Direct Instruction 5
- Other Uses of Television for Instruction 6
- Other Applications of Films for Instruction 10
- Attitudes Related to Instructional Television 11
- Attitudes Related to Instructional Films 13
- Effects of Production Variables in Instructional Television Programs 14
- Effects of Production Variables in Films 15
- Research Methodology 16

Summaries of Studies 19

Index

- Author 195
- Subject 201

Review of Trends in Research on Instructional Television and Film

by

Leslie P. Greenhill
DIRECTOR, *University Division of Instructional Services*
The Pennsylvania State University

Introduction

EDUCATIONAL HISTORIANS of the future will probably note that the period from 1945 to 1965 represented two decades of intensive research on the development and use of films and television as instructional media, that is to say, as media for the stimulation of learning in more or less formal classroom situations. These historians may also note that this research was stimulated largely by a predicted and actual shortage of competent teachers and by the need to educate a rapidly growing population which had to learn more than ever before because of the explosion of human knowledge during this period.

The great volume of research on these media has been made possible largely by considerable financial support, first from the Defense departments in the late 1940's and the 1950's; then by several of the philanthropic foundations in the mid-1950's; and more recently, by the Federal government, through such agencies as the Office of Education. Alongside well-financed programs of research and well-supported projects there has been a steady stream of dissertation research conducted by individual researchers, sometimes under the auspices of well-financed programs and often on the "shoestring" support that often characterizes doctoral studies.

Objectives of the Review

In 1951, under the auspices of the Instructional Film Research Program at The Pennsylvania State University and with the financial support of the U. S. Naval Training Devices Center, Hoban and VanOrmer[1] produced a comprehensive report which summarized the results of more than 200 experiments on instructional films conducted between 1918 and 1950. Practically all of the studies of television for instructional uses have been conducted since 1950. In fact, the decade from 1954–64 might be characterized as the era of most intensive research on instructional television.

The nearly 350 abstracts which constitute the main body of the present report represent a substantial sampling of the research on instructional films and instructional television in the period 1950 to 1964. The purpose of this introductory review is not to summarize individual studies; rather, it is to point out the directions in which the research has been going, the present status of the research, and some possible future directions.

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[1] C. F. Hoban and E. B. VanOrmer. *Instructional Film Research 1918–1950.* Technical Report No. SDC 269-7-19. U. S. Naval Training Devices Center, Port Washington, L. I., New York: December 1950.

Categories of Research

The abstracts in this study fall into certain categories under which the trends will be discussed:

- ☐ Comparisons of televised with direct or face-to-face instruction.
- ☐ Comparisons of filmed or kinescoped courses with direct instruction.
- ☐ Studies of other uses of television for instruction.
- ☐ Studies of other applications of films for instruction.
- ☐ Studies of attitudes related to instructional television.
- ☐ Studies of attitudes related to instructional films.
- ☐ Studies of effects of production variables in instructional television programs.
- ☐ Studies of effects of production variables in films.

Comparisons of Televised Instruction With Direct Instruction

By the far the largest category of research is that of "relative effectiveness" studies, in which the performance of students instructed via television has been compared with the performance of others instructed directly, or face-to-face, by a teacher in the usual way. This therefore represents perhaps the most important trend of research in the last decade.

These relative effectiveness studies range in instructional level from elementary school to college and to military training. They encompass a wide scope of subject matter—elementary school reading, foreign language, speech and listening skills, physical sciences, social sciences, biological sciences, mathematics, and military subjects such as basic training, electronics and others.

The length of the studies varies from one or a few lessons to entire courses extending over a semester or a year. One military study involved a comparison of the performance of students who viewed television approximately 8 hours a day for a period of 1 week with that of trainees who received a similar amount of direct classroom instruction.

The vast majority of these studies has revealed "no significant differences" in measured performance between students who were instructed via television and those who were taught directly. A few studies have shown differences in favor of television, and a few others have found differences in the opposite direction. In some instances differences that were found on immediate tests of learning disappeared when students were retested after a delay of a few days or weeks.

Problems of Experimental Design

It must be said that the studies are very uneven in quality, which makes interpretation of the results difficult or impossible. For example, in many studies the main variable (TV versus direct instruction) is mixed in with other variables, such as different teachers teaching under each of the conditions. In this situation the comparison is really between Teacher A teaching on television, assisted by Teachers B, C, D in follow-up work, with Teachers E, F, G, H in regular classroom situations. According to the varying experience and competence of the teachers in the several treatments, the results may favor one "method" or the other.

Another serious deficiency in some of the studies is the use of existing or intact classes (often in different schools) in the different comparison groups. This situation is often dictated by administrative convenience or by ignorance of the fact that such a situation makes comparisons between methods of instruction virtually uninterpretable. In many of these studies efforts were made to measure initial differences between classes on some variable or variables expected to influence the results of the comparisons, such as intelligence, previous experience, and the number of members of each sex in the groups, and then students were either "matched" across the methods being used, or some statistical technique was employed to compensate for differences between the groups to be compared.

These efforts to compensate for inadequacies in experimental design are themselves inadequate in many instances, because other unrecognized variables may be operating to bias the results. An example

of such uncontrolled variables might be differences between schools in socioeconomic status of students (i.e., some schools draw children from homes with richer environments than others). While the children may appear to be equal in previous knowledge, one group may have more potential for learning than the other or may get more help at home. A second kind of uncontrolled variable might be differences in motivation which result from differences in morale in various classes or schools.

The foregoing are cited merely as examples of factors that could bias the outcomes of comparisons. There may be many others. The only satisfactory way to deal with such variables is randomly to assign students to the comparison groups in such a way that uncontrollable biasing variables of the kind mentioned have an equal chance of affecting both groups. The results of experimental comparisons involving such randomized groups can then be interpreted using probability theory and appropriate tests of significance.

In a study conducted in 1963, Stickell[2] carefully examined some 250 comparisons between televised instruction and direct instruction. These were classified according to the extent to which they met his rather rigorous requirements for adequate experimental designs. Of the 250 comparisons, 217 were classified as "uninterpretable," 23 were classified as only "partially interpretable" because of various defects in experimental design, and a mere 10 studies as "interpretable." Of these 10, all showed "no significant differences" in learning at the .05 level between televised and direct instruction.

It thus seems that the finding of "no significant differences" in comparisons of measured learning from direct and televised instruction is the only outcome from the "comparative effectiveness" studies in which there can be much confidence.

Significance of Nonsignificant Differences

Many administrators and researchers have expressed disappointment at the frequency with which nonsignificant differences in learning have resulted from comparisons of direct and televised instruction and they seem to regard this finding as a negative result.

In the section on possible lines for future research given below, some of the reasons why nonsignificant differences seem to typify the results of this kind of research will be discussed. Although a finding of no significant difference does not prove that no differences exist, there is a practical value in such results in that consistent findings of nonsignificant differences in learning from different instructional methods give educational administrators some confidence that several alternative methods of instruction are available for use, and allow them to choose which one should be used in a specific situation on the basis of considerations other than relative instructional merits.

For example, television has excellent distributive powers. It can extend instruction (good or bad) to many places simultaneously. It is, therefore, an excellent means of extending experienced teachers and above-average teaching resources to larger numbers of students than would be possible under direct instruction. In this way television can offset a shortage of experienced teachers. To the extent that the television teacher is more experienced than the available classroom teachers and has better instructional resources than might be available to the average classroom teacher, it is possible that televised instruction can be superior to direct teaching. Some of the findings favoring televised instruction can possibly be accounted for by differences in the abilities of the teachers in the comparison situations rather than by the influence of television *per se*.

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[2] D. W. Stickell, *A Critical Review of the Methodology and Results of Research Comparing Televised and Face-to-Face Instruction.* Doctoral dissertation, The Pennsylvania State University, June 1963.

Another reason for using television might be to offer courses that would otherwise be unavailable. In some cases there might also be economic advantages in using televised instruction.

It is for these reasons that the use of instructional television has expanded so rapidly during the past 10 years.

Comparisons of Filmed or Kinescoped Courses With Direct Instruction

A relatively small number of studies has been concerned with comparisons of learning from filmed courses, sometimes supplemented by a local teacher, with direct instruction. Some of the filmed courses were originally produced as films; others were originally produced as television programs and were made available for classroom use in the form of kinescope recordings.

A study by VanderMeer[3] in 1949 compared learning of groups of students in a ninth-grade biology course who were taught by (1) 44 sound films alone (each film was seen twice), (2) the same films plus specially prepared study guides, and (3) standard lecture-demonstration-discussion methods by a classroom teacher. There were no significant differences in student performance among the three methods on immediate tests or on delayed recall tests after 3 months. However, the "films only" group took about 20 percent less time than the other two treatment groups to complete the course.

This general pattern of no significant differences has characterized many recent studies that have compared filmed courses with direct instruction in college-level psychology and communication skills; high school chemistry, physics, history, and industrial arts; and some technical subjects in military training. These studies indicate the potential usefulness of such film series as those produced under the auspices of the Physical Sciences Study Committee and the Biological Sciences Curriculum Study Committee.

In individual situations it might be desirable to conduct quality control experiments to determine whether the use of such film series has advantages over the existing classroom method. However, in many high schools and colleges where great difficulty is being experienced in securing qualified faculty in certain specialized subjects, effective learning can undoubtedly be stimulated by such film series or series of videotapes produced by other institutions, supplemented by whatever local resources are available.

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[3] A. W. VanderMeer. *Relative Effectiveness of Instruction by Films Exclusively, Films Plus Study Guides, and Standard Lecture Methods.* Technical Report SDC 269-7-13, U. S. Naval Training Devices Center, Port Washington, Long Island, N. Y.: July 1950.

A large area for future development and experimentation is the filmed course for home study using the recently introduced cartridge-loading 8 mm film projectors. Such courses may prove to be very satisfactory for the retraining of adults, especially in technical and professional fields.

Other Uses of Television for Instruction

Although the dominant trend in instructional television studies over the past 10 years has been to compare televised with direct instruction, there has also been a fairly steady stream of research on the potential uses for television other than the presentation of substantial parts of courses, and on ways of using television for classroom instruction more effectively.

Observation of Demonstration Teaching

Because of the difficulties of taking increasingly large numbers of teacher trainees into classrooms to observe demonstration lessons, a number of studies have been directed toward comparisons of televised observation of teaching situations with actual classroom visits. One of the main difficulties of such studies is the selection or development of appropriate criteria for evaluating the effectiveness of the methods being compared. In some instances, where the observations have been part of a required course on methods of teaching, the course examinations have been used as the criteria. In such cases there may be very few questions on which teacher demonstration observation has a direct bearing. In several other studies, strong efforts have been made to determine the unique contributions to the learning of student teachers which should be derived from such observations, and special situational tests covering classroom behavior of teachers have been developed to assess the effects of such observations. Some studies have been concerned also

with students' preferences for one method of observation or another.

The generalizations that can be offered at the moment indicate that teacher trainees appear to gain as much from televised observations as from actual visits; that they tend to prefer direct observation and, where televised observations are used, two or more views of the classroom being observed are preferred rather than only one. In many situations it has been found possible to install two or three television cameras, one of which provides a general view of the classroom being observed, while the others provide closeups, and all two or three scenes can be viewed simultaneously on adjacent television receivers by the student teachers. This method of observing teaching demonstrations has several practical advantages: (1) it permits observations by larger numbers of students than could be handled in classroom visits; (2) concurrent analysis and discussion can be conducted; and (3) the viewing can be at a convenient location remote from the demonstration classroom.

The major technical problem appears to be in the pickup of classroom conversations by microphones. This problem is being solved in various ways: through the use of acoustical treatment of the classroom, including a rug on the floor; by multiple microphones; and, if necessary, by a roving microphone handled by the demonstration teacher, whose own voice can be conveniently amplified by means of a lavalier microphone on a long cord or by a wireless microphone.

Another use of television for teacher training that is just beginning to be studied and that deserves more study and evaluation is film or videotape recording of teaching demonstrations either by teacher trainees or experienced teachers and the subsequent analysis and discussion by the teacher concerned and by others who may be able to assist in improving such classroom performances. The effectiveness of before-and-after videotape recordings could be compared under controlled conditions to determine whether changed classroom behavior on the part of a teacher actually produced more learning by the students.

Inservice Training and Professional Training

Another observable research trend of the past few years is the use of television for inservice training of teachers and other professional personnel. Some of the studies in the accompanying abstracts indicate that such objectives can be effectively attained.

With the increasing need for retraining in many professions because of new developments and the need to train people for new jobs as the result of technological changes, it would appear that much more research will be needed to develop effective procedures to help individuals avoid professional obsolescence. The use of television or films may be the only practical way of carrying such training to the many who need it.

Teaching Performance Skills

Another line of research is developing out of a few studies of the use of television for teaching performance skills (technically known as "perceptual motor skills"). Much more research on teaching such skills with films was done in the early 1950's, probably because of the interest

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of the military sponsors of film research in improving the performance skills of military trainees. However, the flexibility and reach of television make it a potentially excellent medium for teaching a wide variety of perceptual motor skills. In the accompanying abstracts a few studies have dealt with the teaching of typewriting, elementary-level reading, and the development of laboratory skills in the sciences.

Many possibilities for future exploration and study suggest themselves in the development of reading proficiency in high school students and adults, the teaching of troubleshooting for repairmen, the teaching of assembly skills, even the teaching of improved driving habits for car owners.

In teaching some skills it is undoubtedly necessary to provide for concurrent practice by the learner. To achieve this, a demonstration is presented in a series of steps, and time is allowed for the learners to perform each step on their equipment before the next step is shown over television. Some of the early film research studies testified to the efficiency of this method if the rate of development of the presentations was slow enough to permit the learners to alternate attention between the demonstration on film and their own performance.

In teaching certain kinds of skills at the elementary school level (e.g., foreign langauge), it has been found advantageous to elicit the help of parents by having them view the broadcasts and then provide an extension of the learning situation at home. Such a procedure might well be used for assisting preschool children to acquire reading skills, by teaching parents the basic requirements for developmental reading.

Supplementary Activities

An increasing number of research studies have investigated various means of supplementing televised instruction. The use of workbooks or study guides, correspondence materials, programed materials, and discussions led either by qualified teachers or by advanced students have been included.

Whether or not these supplements lead to increased learning depends on whether they are used in addition to the full television lesson or lessons, thus requiring increased time, or whether they are substituted for part of the lesson. In the former case, the studies tend to show increases in learning to the extent that the supplementary activities are relevant to what is being tested and if they reinforce or clarify what was presented in the television lessons. If the supplementary activities are substituted for part of the television lesson, it does not seem to matter very much which combination is used. There is little doubt, however, that repetition in some form or another is one of the most effective ways of increasing learning. In the practical classroom situation such repetition may result from supplementing televised instruction with discussion, projects, homework assignments, reading, laboratory work, and the like.

Another continuing line of research has been concerned with viewing conditions in television classrooms. Some studies have been concerned with such variables as size of the viewing groups, screen-viewing angle and distance, and small-screen versus large-screen television. In most of these studies, within broad limits, it has been found that these variables do not relate significantly to learning. Obviously the learners have to be able to see the stimulus materials, to read printed symbols presented over television, and to hear what is carried by the audio. In most television classroom situations, this is possible, although poor acoustics or excessive light from outside or inside the room may reduce the clarity of picture and sound cues.

For practical production reasons, it is generally desirable to set some standards for maximum viewing distance, and then in selecting size of print and amount of material to be covered by the television camera, the producer should ensure that such material will be legible when viewed by learners with normal eyesight from the maximum viewing distance. A commonly used standard for maximum viewing distance is 12 times the width of a television screen and for viewing angle not more than 45° on either side of a line perpendicular to the face of the screen.

One aspect of the learning environment which has not been systematically studied is the physical climate—temperature, humidity, and air circulation. Many television classrooms and rooms used for film projection have very poor ventilation, and this condition may interfere with learning.

Other Applications of Films for Instruction

In recent years the research on the use of films for a variety of educational purposes has closely paralleled the research on television. This is not exactly surprising, because some film studies have actually used kinescope recordings produced from television programs. In fact, it is often difficult to decide whether a specific study is television research or film research.

Films, however, do have some special characteristics. It is usually easier to record a wide range of stimulus materials on films from many different locations and in this way to bring the outside world into the classroom. Furthermore, while television may afford an excellent way of distributing films to classrooms, there are many classrooms that do not have access to television. In addition, some new ways have recently been developed for packaging and using instructional films that encourage new applications. Because of these possibilities, there have been some differences in research on the use of films and television for some instructional purposes that should be noted.

Observation of Demonstration Teaching

Several studies have used documentary films of actual classroom teaching for teacher-training purposes. This has permitted a wider sampling of teaching demonstrations than would ordinarily be possible with live televised observations or classroom visits. The films can be reviewed several times if desired.

Similarly, films of student-teaching performances have been made and used to assist the training of student teachers. Some of these studies have shown significant differences in favor of the film groups in comparison with those submitted to traditional procedures.

Films for Teaching Skills

There have been some studies in the past 10 to 15 years in which films have been used for teaching performance skills such as reading, typing, sewing, athletic skills, and foreign language vocabulary.

As indicated in a previous section, much more of this research is needed, as many new applications for films have been opened up by the development of special projectors and easy-to-load cartridges containing 8 mm film loops. This equipment provides excellent opportunities for establishing self-instructional situations, especially for teaching laboratory, language, and reading skills.

The use of this equipment is at present in what might be described as a developmental phase. It should soon be ready for some serious research.

Studies conducted in recent years on the methods of using films provide further evidence of the effectiveness of repetition as a means of increasing learning. However, several studies have shown that even this variable can be used to excess, and that it is possible to produce a reduction in learning as well as negative attitudes by too many showings of a film (usually in excess of two or three).

There is some evidence that practice in learning from a given medium results in the development of an ability to learn from that medium with increasing effectiveness.

Feedback

There have been efforts to provide various methods of feedback to the instructor and/or learner in learning situations where extensive use is being made of television or films.

Some studies have involved the use of two-way communication systems in conjunction with closed-circuit television. Others have included the presentation of questions at the end of a television program or film showing—with provision of correct answers to the learners, and knowledge of level of performance to the teacher who can then supplement the material provided by the film or television lesson.

Immediate knowledge of results on tests appears to increase learning, but there are not enough studies of the use of electronic feedback and classroom communicator systems to be able to note any consistent trends in results.

It is suggested that if such feedback systems are to operate effectively, every student must respond to questions, respond to them frequently, and receive immediate knowledge of results. An alternative way of providing for such interaction between learners and stimulus materials is to program questions and knowledge of results into the filmed or televised lessons themselves. Some studies of these possibilities will be discussed in a later section.

Realistic Performance Tests

An application of films and television which has been the subject of very little research is the use of these media for the presentation of lifelike performance tests. Such test situations can contain most of the visual and sound stimuli found in real life and can test performance beyond that which paper-pencil tests can cover.

Because they present concrete situations, such tests can avoid the ambiguities of meaning sometimes present in verbal tests, and this can result in high reliability.

Attitudes Related to Instructional Television

Attitudes of Students and Faculty

Research on instructional television has placed heavy emphasis on assessing the attitudes of students and teachers to the use of television for the presentation of classroom instruction. In fact, a considerable number of the "relative effectiveness" studies also included attitude measures as well as tests of learning.

It is interesting to speculate on the reason for this trend. Perhaps it is because television appears to threaten the position of the classroom teacher, or is perceived as a technological device which will take the human element out of teaching and perhaps result in less effective learning.

For whatever reasons, there have been many studies, the results of which have varied tremendously. In some situations students have been quite negative to televised instruction; in others they have been highly favorable; in many studies they have been neutral. It is difficult to sum up the trend of student opinions. Students' opinions are most probably a function of the attitudes of their teachers, or of the quality of the instruction presented to them by means of television. In most cases it would appear that students' attitudes have not been a serious barrier to the use of instructional television.

On the other hand, faculty attitudes have often been somewhat more negative than those of students, and in many institutions of higher education, negative attitudes of the faculty have been the greatest impediment to the use of television. However, when the need to use television is clearly explained and justified (for example, by increased student enrollments, or an actual shortage of faculty), there are usually sufficient numbers of good teachers who are willing to teach on television to make its use viable.

It has been said that "people are often down on things they are not up on." Several studies have indicated that one way of gaining increased faculty acceptance of instructional television is to involve faculty members actively in the planning and conducting of an experiment in the use of television for teaching a course in their own discipline.

Methodology in Attitude Measurement

The development of varied methods for assessing students' attitudes to televised instruction is one of the most interesting trends. In some studies simple questionnaires have been used which sought to ascertain what students thought about specified aspects of classroom uses of television. Other studies have made use of Thurstone or Guttman attitude scaling methods.

Some experimenters have attempted to obtain indications of attitudes by means of indirect methods, such as asking students to "size up" the subjects they were taking, on the basis of several criteria. The experimenters could then see how televised courses were "sized up" in relation to other courses.

In recent years there has been rather extensive use of Osgood's Semantic Differential to assess students' attitudes to instructional television.

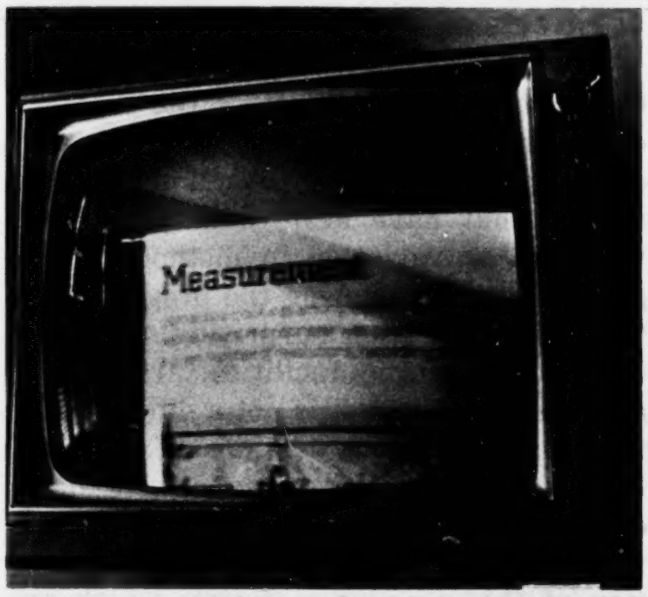
Most of the approaches that have been used have employed verbal measures of one kind or another. However, there is a variation of this approach which appears to have many possibilities for assessing students' attitudes as they are expressed in preferences for different methods of instruction. This is the "free-choice" method. A group of students is randomly divided into several subgroups, each of which receives a different method of instruction. After a certain period of time, the groups switch methods for a similar period of time. They are then given a free choice among the methods for several successive class periods, after which the method they choose is the one they must accept for the remainder of the year or semester.

An alternative procedure is to have the students vote on which method they would prefer, following exposure to the alternative methods. Whatever the majority wishes is the treatment that the entire group receives for the ensuing period. This procedure avoids some of the difficulties of verbal measures of attitudes and provides an opportunity for obtaining a measure of actual behavior.

In summary, most of the studies of students' attitudes toward instructional methods have found little or no relationship between attitude toward or preference for different methods of instruction, and actual measured learning from those methods.

Use of Television to Influence Course-Related Attitudes

One of the objectives of much teaching is to influence students' attitudes toward ideas or issues in certain desired ways. There have been a few studies of the ability of instructional television presentations to change students' course-related attitudes. Generally they have shown that such attitudes, which can usually be modified by appropriate information, are changed in a favorable direction by televised instruction and to about the same degree as they are changed by direct instruction.



Additional studies of the factors that produce cognitive attitude changes in students, whether by televised or other methods of instruction, are needed.

Attitudes Related to Instructional Films

It would seem that the trend in film research so far as attitude studies are concerned is the reverse of that in research on instructional television. Few studies have been concerned with assessing attitudes toward films as a medium for instruction, whereas a considerable number have been concerned with the use of films to modify students' attitudes and with the factors that produce attitude changes from film stimulation.

Generally, it has been shown that relevant information presented in films will produce changes in course-related attitudes. The way in which the students perceive the role of the communicator and his prestige *as they see it* appear to be important factors in the effectiveness of this type of communication. Another factor is the perceived usefulness of the information. Students who believe that the material to which they are being exposed will have early use or will be subject to testing at an early date tend to learn more than students who do not have these attitudes. Thus, pointing out the personal relevance of instructional material to students may have an important effect on the degree to which the material is learned.

Effects of Production Variables in Instructional Television Programs

One disappointing aspect of the research on instructional television over the past decade is the relatively small number of studies that have dealt with production variables or variation in methods of organizing and presenting the program content. This is rather surprising since television production facilities are widely available and since it is not a difficult task to develop differing versions of televised lessons or courses for comparison under controlled conditions. Furthermore, it is not unreasonable to expect that manipulation of the stimulus materials which are presented to students might be one of the most likely ways of producing differences in learning.

Some studies reported in the abstracts have dealt with rather gross variables, such as the use of visualization (e.g., pictures, demonstrations, films, diagrams, and discussion panels) versus a lecture-blackboard presentation over television. Others were concerned with the method of presenting information in a television program, for instance, by means of a lecturer, a discussion panel, or interview. Most of these studies have failed to find significant differences in learning. However, a study by Skinner[4] found that an actor trained to perform as a "good" speaker was able to produce significantly higher scores on immediate tests and delayed retention tests than he did when he acted as a "poor" speaker. Another study, by Schwarzwalder,[5] found that fifth-grade pupils generally did significantly better on a science content test when they had viewed television programs that had planned continuity, visual reinforcement, and had been the result of a team approach to make effective use of the medium. Conversely, in another study of production variables, Ellery[6] found no significant differences in learning of students when exposed to televised programs using such production variables as dollying versus cutting, production errors versus no production errors, a limbo set (no visible background) versus a nonlimbo set, and flat lighting versus key lighting.

One very encouraging recent trend is the incorporation of some of the techniques of programed learning into television programs. This involves the inclusion of questions or short problems for students to solve, followed immediately by knowledge of results. Such an arrangement provides for active audience participation, with immediate reinforcement.[7,8] It is also an excellent way of working repetition into a television program. There will probably be an increasing amount of sophisticated research along these lines in the future.

Another approach that has much potential for improving televised instruction may be termed "empirical course development." Briefly, this process involves—

1. Defining course and lesson objectives

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[4] T. D. Skinner, *An Experimental Study of the Effects of Prestige and Delivery Skill in Educational Television.* Doctoral dissertation, University of Michigan, 1963.

[5] J. C. Schwarzwalder. *An Investigation of the Relative Effectiveness of Certain Specific TV Techniques on Learning.* USOE Project No. 985, KCTA–TV, St. Paul, Minn. 1960.

[6] J. B. Ellery. *A Pilot Study of the Nature of Aesthetic Experiences Associated with Television and Its Place in Education.* Wayne State University, Detroit, Mich., 1959.

[7] G. L. Gropper and A. A. Lumsdaine. *The Use of Student Response to Improve Televised Instruction—An Overview.* American Institute for Research, Pittsburgh, Pa., 1961.

[8] C. R. Carpenter and L. P. Greenhill. *Comparative Research on Methods and Media for Presenting Programmed Courses in Mathematics and English.* The Pennsylvania State University, University Park, 1963.

in terms of detailed descriptions of desired terminal behavior of students.

2. Building, testing, and refining adequate measures of student performance.

3. Selecting content and presentation methods which appear to be appropriate to the stated objectives, and recording these on videotape.

4. Exposing students to the televised course and administering the criterion test or tests.

5. On the basis of an analysis of test performances and on the basis of interviews with students, making modifications in the original lessons and recording revised versions.

6. And finally, comparing the effects of the original version and the revised version on the performances of students randomly assigned to the two treatment groups.

Through the use of this process, many production variables could be studied, modified, and evaluated.

Effects of Production Variables in Films

There has been a long tradition in film research, going back to the Instructional Film Research Program at The Pennsylvania State University and the studies conducted by the U. S. Air Force, which has manipulated film variables by producing special versions of films incorporating defined variables and then comparing the effects of these versions on appropriate groups of learners under controlled conditions.

This type of research has tapered off in recent years, possibly as the result of a shift of emphasis to research on television and partly because such research studies require good film production facilities and the kind of adequate financing that can only come from a sustained program of research.

Many of the studies of production variables in films included in the accompanying abstracts date from the early and middle 1950's. There are comparatively few recent ones.

Since the variables studied have been so numerous, it is not possible to summarize the results here. It should be noted, however, that several studies have investigated various methods of obtaining audience responses by inserting questions in films or by having the audience call out words.

Other studies have compared inserted titles with no titles, sound films versus silent films with teacher's commentary, motion pictures versus a series of still pictures, animation versus live photography, effects of variations in vocabulary difficulty, and various kinds of attention directing devices.

A number of these studies have found small but significant differences in learning. However, it should be noted that the majority of studies which have compared black and white with color films have not found that this variable produced marked differences in learning.

There is not the slightest doubt that suitable films stimulate learning and that the way in which films are produced can influence the degree of learning. On the other hand, it would appear that no techniques have yet been discovered for consistently producing large and significant differences in learning.

Research Methodology

In reviewing the film and television research of the past 15 years, two characteristics are evident principally in the television research. The first is the number of the studies that had deficiencies in their experimental designs. The most common of these were the use of nonrandom groups and the confounding (uncontrolled mixing) of variables. In addition, some studies used very short tests, and some studies provided no evidence of test reliability. This situation makes interpretation of results very difficult indeed.

The second characteristic of the research is the large number of nonsignificant differences that have been obtained, and even where statistically significant differences were found, there is an absence of differences of large magnitude, say of the order of two to one or greater between different methods of instruction.

It is interesting to speculate on the reasons for the failure to find large and significant differences. Some people have suggested that the measuring instruments are not sharp enough to detect differences which may exist; others suggest that the use of predominantly verbal tests with visual media is the reason. Another hypothesis is that many studies have dealt with comparisons of complexes of variables which tend to cancel each other, while still other experiments were concerned only with single variables which in many cases are not sufficiently potent to produce significant differences in learning.

Another hypothesis is that the "law of compensatory effort" is operating in many learning situations. This law asserts that students have certain levels of aspiration and that they strive for a particular grade. If the instruction is improved in a course which is the subject of an experiment, many students will put less effort into that course and will work harder in other courses which are not being taught as well and where more effort is needed to achieve the desired grade.

In a more serious vein, it is suggested that possibly the most fruitful areas for research lie in structuring and organizing the stimulus materials themselves, and in the manipulation and control of student responses. Comparisons among presentations which simply involve different media are not likely to be very fruitful.

Another approach to finding significant differences might be through the use of "additive" designs[9] in which the experimenter begins with a basic treatment and then progressively adds variables, and compares the new combination of variables each time with the basic treatment.

An alternative to this type of approach is the use of the complex multi-variate design involving a considerable number of variables in different combinations. In this situation it may be found that interactions among variables are very important and that certain combinations of variables have reinforcing effects on each other, thereby producing significant effects on learning. Results of preliminary studies conducted by Siegel[10] of Miami University at Oxford, Ohio, indicate that such experiments which manipulate the "instructional gestalt" by means of multi-variate designs may be very productive.

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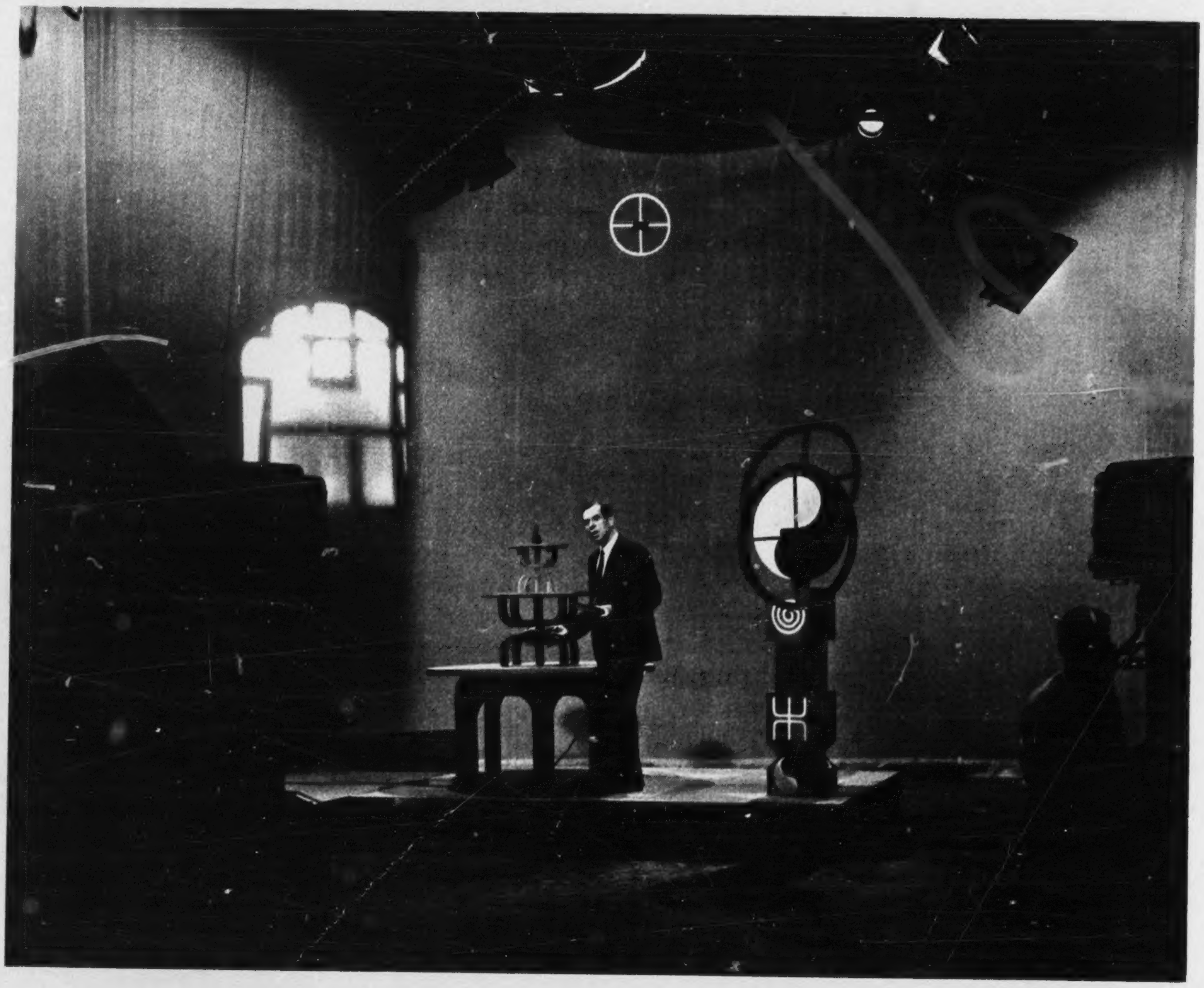
[9] L. P. Greenhill. "New Directions for Communication Research," *Audio-Visual Communication Review.* 7(4):245-253, fall 1959.

[10] L. Siegel and L. C. Siegel. "The Instructional Gestalt: A Conceptual Framework and Design for Educational Research," *Audio-Visual Communication Review.* 12 (1):16-45, spring 1964.

Whenever substantial differences in learning in a classroom experiment are found, the study should be repeated several times, using similar but different populations to be sure the results are not due to chance or are an artifact of some specific experimental situation. The building of a tradition for replication of studies in research on instruction is needed.

Meanwhile, the research of the past 15 years gives some confidence that a variety of media and methods of instruction can be used effectively to meet different needs, and that the determining factors in selecting such methods and media are not so much the effects on learning, as they are other considerations, such as the lack of availability of good teachers, the need to reach individuals in various locations, and perhaps economic considerations.

In the final analysis, it may be that the "best" method of instruction is one that provides students with a wide variety of learning situations, situations which will develop the varied learning skills that they will need for continuing their education throughout their lifetimes.



Summaries of Studies

1. ABBEY, JUNE C., and others. Home and hospital viewing of continuing education broadcasts under three presentation-response conditions. Theo. S. Grant and Irving R. Merrill, *Television in Health Sciences Education.* USOE Project No. 164. San Francisco: University of California, San Francisco Medical Center, Sept. 30, 1963. p. 8–21. (Offset).

Problem: Determine effects of group viewing and response conditions on learning.

Sample: 120 professional nurses from three cities.

Subject taught: Recent advances in nursing care of the aged (two programs each on emotional illness, emphysema, and cerebral-vascular accidents).

Key variables: Individual or group viewing, covert and overt responses, learning, time of testing.

For a pilot study, 35 nurses were assigned to four viewing conditions: groups one and three had overt responses to participation questions with feedback, group two had covert responses to participation questions without feedback, and group four had covert responses to a conventional broadcast (having no participation questions) without feedback. Groups one and two were tested a week before the other groups. All subjects watched the two programs on emphysema, the overt response group responding to answer sheets during each program. After the two programs, all took a half-hour nonrelated exam, then all took a 20-item test having half of the items related to emphysema and half nonrelated.

Chi square indicated a significant ($.01 < p < .02$) interaction between overt and conventional responses and related and correlated test items, the overt response group tending to do better on the related items and the conventional group tending to do better on the unrelated items.

The main study was designed in a Graeco-Latin square, with 40 nurses in each of three different cities viewing half-hour TV programs on three different topics in three different orders under the three response conditions. Within each city 20 viewed at home and 20 together. The overt-response treatment programs were 5 minutes longer since they included 10 participation questions which appeared on the screen. The home and hospital viewing groups were equated for age, number of children, and shift worked. Two stations used videotape and one kinescope. All viewers took three 20-item multiple-choice achievement tests.

Subjects (*Ss*) in the overt response condition tended to have higher achievement scores than those in the covert response condition to participation questions, who in turn tended to have higher achievement scores than those in the covert response to conventional broadcasts (without participation questions). Those who viewed at home had significantly higher (.01 level) achievement scores than those who viewed as a group in a hospital. *Ss* had significantly higher achievement scores (.01 level) on the first program viewed than on the two later programs in the series. *Ss* having a complete response had significantly higher achievement scores (.001 level) than other *Ss*. Significant interactions (.01 – .05 level) were also found for city and viewing condition, response completion and viewing condition, and response completion and city.

2. ABEL, FREDERICK PAUL. "Use of closed-circuit television in teacher education: Relationship to achievement and subject matter understanding." *Dissertation Abstracts* 21 (1961), 2999–3000.

Problem: Compare the effectiveness of using closed-circuit television for classroom observation with film and direct observation methods.

Sample: Students in a teaching methods class at Minnesota.

Subject taught: Classroom observation in introduction to secondary school teaching.

Key variables: Learning from direct classroom observation, from television and from film observation, and scores on Horrocks and Troyer Tests.

Students were matched on the basis of Miller

Analogies Test scores and scores on a pretest designed to measure course subject matter. They were then randomly assigned to one of three groups: television, film, and direct observation. The television observations were of a university high school speech and physics class. The film observations were of films produced by McGraw-Hill and Indiana University. The direct observations were in smaller groups of classes in the university high school and other public high schools. Each group watched five periods using its primary observation method and one period each by the other two observation methods.

Instruments used to measure learning of the subject matter and ability to apply that knowledge were the midquarter and final examinations in the course, and Horrocks and Troyer Tests of Human Growth and Development.

No significant differences were found among the three groups as determined by the scores on these two instruments.

3. ALABAMA, UNIVERSITY OF. "Learning Aural-Oral Spanish Skills by Television." University of Alabama and the Alabama Special Educational TV Project, December 1960. NAEB Research Fact Sheet, Series I, 91, *NAEB Journal* 20 (May 1961), 1–2. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 181 students.

Subject taught: Spanish aural-oral skills.

Key variables: TV teaching, face-to-face teaching with experienced instructors, face-to-face teaching with inexperienced instructors.

An educational TV Spanish program was produced by University of Alabama Broadcasting Services and taught by a university professor. The high schools used ETV program in Spanish classes with a face-to-face session supplementing the TV lesson taught by a qualified or nonqualified teacher. Control sections were taught entirely by face-to-face methods. In all, 12 classes were used.

Achievement was evaluated by a two-part test: (1) a list of 21 questions to be asked and answered in Spanish, and (2) a Spanish-reading selection. There were 71 students selected at random to be interviewed in schools. Interviews, given the last month of the school year, were recorded and evaluated by a committee of expert judges for pronunciation, comprehension, vocabulary, and grammar.

Conclusions.—The interrelationships indicate considerable agreement between independent judges in rating the two variables of pronunciation and comprehension, vocabulary and grammar. The intervariable correlations indicate that considerable variance was not common to the two variables existing. Students taught the aural-oral Spanish skills by ETV and nonqualified teachers are as proficient in those skills as students taught by qualified teachers in a face-to-face situation. Students taught by ETV and qualified teachers do learn the measured aural-oral skills significantly better than either non-ETV students taught by qualified teachers or ETV students taught by nonqualified teachers.

4. ALEXANDER, FORREST DOYLE. "An experiment in teaching mathematics at the college level by closed-circuit television." *Dissertation Abstracts* 22 (1962), 2805.

Problem: Compare achievement in mathematics when presented by television or by face-to-face methods, and determine the effectiveness of using two instructors rather than one.

Sample: Male students.

Subject taught: Fundamental mathematics.

Key variables: Number of instructors, television presentation, and learning.

All students were randomly assigned to one of four sections. Two sections received 30 minutes of televised lecture; one section finishing the hour with a discussion led by the television professor, in the second section a different teacher led the discussion. Both sections three and four had a face-to-face presentation by an instructor who followed the same outline as the television teacher. A partition was then placed between these two groups. The third section continued to be taught by the same teacher, the fourth section by another teacher. Four teachers were used altogether.

Achievement was measured by a specially constructed instrument (Pearson $r = .90$ and Kuder-Richardson #8 $r = .88$).

Analysis of variance technique failed to reject the following hypotheses: there is no difference in achievement scores between the television and nontelevision lectures; there is no difference in achievement scores between sections having one or two instructors, and there is no interaction between instructors and modes of presentation.

5. Alexander, Virgil William. "The contribution of selected instructional motion pictures to achievement in varying school situations." *Abstracts of Doctoral Dissertations, the University of Nebraska,* Vol. 11. Lincoln: University of Nebraska, 1950. p. 146–152.

Problem: Determine the achievement of pupils seeing motion pictures as a function of school size, class size, teacher preparation, teacher experience, and teacher training in audiovisual materials.

Sample: 29 Nebraska high schools in 1948–49 and 28 in 1949–50.

Subjects taught: General science, biology, physics, American history, world history, and modern problems.

Key variables: School size, class size, teacher preparation, teacher experience, teacher training in audiovisual materials, and learning.

All students took Cooperative Test Service standardized tests before and after the school term for all courses except modern problems. Students taking modern problems took a USAFI instrument as pre- and posttest. CTMM scores were also available for all students. Schools were grouped according to size, those with less than 101 students, 101–200, and 201 or more. Teacher preparation was operationally defined as teacher education, and three classifications were made in that category. Teacher experience also had three classifications. Classes were grouped into less than 16, 16–30, and 30 or more students. Teachers were divided into two groups, those having or not having had specific training in audiovisual materials.

Analysis of covariance technique was used to determine differences among each of the five variables. No consistent trends resulted from analysis of the data. Films contributed more to achievement in larger classes (as defined in the experiment) than smaller classes. Teacher training in the use of audiovisual materials did not affect achievement made by the students. The author points out this may be only a reflection of the quality or emphasis of the training course, or a contamination of teacher training in the experiment. Films may be less effective in small schools (as defined in the experiment) than in large.

6. Allen, M. R. *Quartermaster Training Command Education Television Study.* Fort Lee, Va.: Quartermaster School, Quartermaster Training Command, 1954. (Duplicated). [Prepared from abstract in Kumata, Hideya, *An Inventory of Instructional Television Research.* Ann Arbor, Mich.: Educational Television and Radio Center, 1956, p. 32.]

Problem: Feasibility of mass teaching by TV.

Sample: 107 college students, 42 Army reservists.

Subject taught: Army Food Service.

Key variables: TV teaching, face-to-face teaching, student attitude inventory.

Purpose of the experiment was to explore the feasibility of teaching Quartermaster Corps subjects via TV using low-cost methods. A 4-hour course, *Food Service Activities in the United States Army,* was telecast over KUHT to ROTC students and a small group of reserves. There were 47 ROTC students who received the instruction via TV and 60 ROTC students who received face-to-face instruction. Out of 500 reserves notified about the series, 42 participated. The same instructor, instruction, and scripts were used for any one day's presentation. The TV students were split into three classes as were the non-TV students. Thus in any presentation, five such lectures were given; three different classroom hours, one TV presentation to two classes of TV students (viewing in different rooms) and an additional TV presentation for the third TV class. Another small group, not included in the analysis, viewed some of the TV lessons and received the remainder of the instruction in the regular classroom. All students took a 32-item multiple-choice and true-false examination 4 days after the conclusion of the course. The TV students executed an "acceptability" questionnaire on the use of TV. The reserves who viewed the program completed a survey questionnaire.

Out of a possible score of 32, students in the regular classroom scored 27.7, the TV students 26.5. There was a slight difference between the two groups in favor of the classroom group, but in comparing their academic standings, the classroom group was higher than the TV group. This, the author believes, could account for the difference.

The ROTC TV students replied on the "acceptability" questionnaire that the TV lessons were about the same or more interesting than other Reserve ROTC training periods. Eight out of 53 thought the hours dull.

From a learning point of view, 31 thought the material was about as easy to learn when presented on TV as compared with classroom instruction; 11 thought learning was easy or very easy; and 11 thought learning by TV was difficult.

Most students thought 1 hour was the maximum for any TV session. Other comments by the students were generally favorable. Reserve officers rated the programs superior to very good. Seven rated the programs as fair. None rated them as poor. Comparing the programs to regular reserve training periods, 24 believed the TV programs were much more interesting, or more interesting, 17 felt they were about the same. Thirty-four found the live TV programs instructive with about the same value as the average training film, while 7 believed the TV programs were less instructive. Other written comments were generally favorable.

7. ALLISON, SARAH G., and PHILIP ASH. Relationship of anxiety to learning from films. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1951.

Problem: Will mild concern of a student to learn result in increased learning?

Sample: 480 college students.

Subject taught: Introductory psychology.

Key variables: Anxiety level inventory, anxiety lowering instructions, neutral instructions, anxiety increasing instructions, film content test.

There were 480 students tested to determine how well they learned under different degrees of learning motivation. One group of students was given instructions to decrease motivation (lower anxiety), another received neutral instructions, and one group was given instructions to increase motivation (increase anxiety), and another serving as a control group was given a test without seeing the film.

Prior to viewing the films, students took an inventory to measure chronic anxiety. There was no significant difference in chronic anxiety in the four groups. The films were presented as part of a regular college course in introductory psychology.

Two films were shown to groups, 237 in the first group, 243 in the second. Scores on test of film content were:

Introduction groups	*Percent for— Film I*	*Film II*
No film	38	35
Anxiety decreasing	53	49
Neutral	56	51
Anxiety increasing	61[1]	56[1]

The authors concluded that (1) the films did teach some material, (2) increasing anxiety uniformly increased scores on test of material in the film, and (3) there was no relationship between chronic anxiety scores and scores on film learning.

8. ALMSTEAD, FRANCIS E., and RAYMOND W. GRAF. "Talkback: the missing ingredient." *Audio-Visual Instruction* 5 (April 1960), 110–112.

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: Not given.

Subjects taught: Geometry, reading achievement.

Key variables: Learning from TV instruction, face-to-face instruction; scores on New York State Regents Examination, scores on Iowa Test–Basic Skills–Form II.

Geometry

Grades on the New York State Regents Examination for two groups (not specified) were compared with those that received total teaching by TV for one group and face-to-face teaching for the other. Groups were students in Cortland, New York, vicinity and matched on unspecified variables.

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[1] Difference of anxiety increasing over neutral instruction significant at .03 level. Anxiety increasing over anxiety decreasing introduction significant at .01 level.

	TV	*Face-to-face*
Percent passing	85	76
Percent scoring 90 or above	31	15

Reading Achievement

This article reports on a study by William Sheldon involving children in Cortland, Truxton, and Virgil, New York, who were taught reading achievement by talkback-equipped TV and compares their scores on the Iowa Test, Basic Skills, Form II, with students in Fulton, New York, who were taught reading achievement by face-to-face methods. Talkback TV involves a feedback system from the classroom to the studio which can be operated by the students in the classroom or the teacher in the studio.

The students in Fulton, while having higher IQ scores before instruction, scored significantly lower on the criterion in five out of six comparisons. The following results were reported:

Test	*TV*		*Face-to-face*		*Difference*	*t–test*
	Score	*Gain—months*	*Score*	*Gain—months*		
Grade 4						
Vocabulary	5.507	11.415	5.022	6.510	4.905	[3] 4.525
Comprehension	5.229	8.603	5.264	6.614	1.989	[1] 1.791
Mean total	5.404	10.117	5.158	6.479	3.638	[3] 4.660
Grade 6						
Vocabulary	7.719	11.773	7.198	7.771	4.002	[3] 3.272
Comprehension	7.307	7.773	7.162	6.710	1.063	0.807
Mean total	7.494	9.835	7.135	7.000	2.835	[2] 2.814

[1] $p = .05$ level of significance (one-tailed test)
[2] $p = .01$ level of significance (one-tailed test)
[3] $p = .001$ level of significance (one-tailed test)

This article also contains a descriptive report of the talkback-equipped televised instruction system in operation at Cortland, N. Y.

9. AMBROSINO, MICHAEL J., WILLIAM H. DUNSTAN, and BERNARD F. HAAKE. "The Schenectady experiment." Schenectady: Schenectady Public Schools, 1956. *Audio-Visual Communication Review* 5 (1957), 557–558. (Abstract).

Problem: Determine the effectiveness of learning by television.

Sample: 215 students.

Subjects taught: Mathematics, chemistry, English, and French.

Key variables: Television presentation, learning.

Achievement test scores of students in in-studio classes were about the same as those of students in television classes.

10. AMIRIAN, GERARD THOMAS. "The retention by elementary school children of natural science material and of science attitude and interest changes following a program of science teaching by television." *Dissertation Abstracts* 23 (1963), 2414. (See also study by Gerard T. Amirian and Ralph Garry, USOE Grant No. 719114. Boston: Boston University, Nov. 1, 1961. (Mimeographed). Also compare studies by A. Cornelia Sheehan and Mary E. Kraft.)

Problem: Evaluate effects of teacher training, television, and face-to-face presentation, and pupil activity in fifth-grade natural science by achievement and attitude.

Sample: 1,600 pupils from 90 fifth-grade classes in 23 Massachusetts towns who were a part of the same sample used in an earlier study. (The Sheehan and Kraft studies had 2,600 pupils.)

Subject taught: Natural science.

Key variables: Presentation of ITV (30 half-hour classes) as initial or final segment of daily lesson; study guide or none; teacher training in science, in instructional television, or none; class assignment or individual pupil project; retention, vocabulary scores, and attitude.

A total of 72 fifth-grade classes was randomly assigned to one of 24 experimental treatments resulting from combinations of the four independent variables listed above. In this followup study of the parent study, half of the pupils were tested 4 months after the parent study, and half were tested 8 months afterwards. All students took four specially constructed instruments: a science vocabulary test, a science information test, an interest inventory, and an attitude scale. The attitude instrument had 60 statements each beginning with "A scientist is someone who. . . ." Pupils responded with *true, false*, or *don't know*. The interest inventory (K–R $r = .97$) determined pupils' interests in science, mechanical, athletic, literary, and humanitarian areas. The science information test had 75 multiple-choice items and had a split-half r of .74, corrected (Spearman-Brown) to .86. The 150-item science vocabulary test had a split-half r of .96, corrected (Spearman-Brown) to .98.

Gains as measured by scores on the information and vocabulary instruments that had been observed in earlier studies were retained and increased 4 and 8 months later. There were no significant differences between experimental (TV) and control (non-TV) groups in science retention or science interest and attitude. There were no significant differences as a result of teacher training, or using ITV to begin or to end the lesson each day. The only difference in the class assignment or individual project was in attitude questionnaire scores, with a gain resulting for class assignment. High IQ groups had significantly greater losses in science interest than low groups, and females significantly greater losses than males. There were no significant differences among the IQ groups in attitude and interest between experimental and control groups.

11. ANDERSON, GEORGE R., and ABRAM W. VANDERMEER. "A comparative study of the effectiveness of lessons on the slide rule presented via television and in person." *Mathematics Teacher* 47 (1954), 323–327.

Problem: Comparative effectiveness of television and face-to-face teaching.

Sample: 105 high school students.

Subject taught: Slide rule operation.

Key variables: Learning, TV teaching, face-to-face teaching, intelligence, arithmetic achievement.

Five classes of high school sophomores were taught operation of a slide rule by television and face-to-face methods of instruction. Three classes were taught in their regular classrooms by open-circuit television. The other two classes were taught the same material by the same teacher the TV group had. Six half-hour periods of instruction were given to both groups over the 6-week experimental period. Before instruction, all students were given the California Test of Mental Maturity and the Stanford Achievement Test in Advanced Arithmetic. On the basis of these tests, two matched groups of 41 students each were selected. While all students in all groups were taught the same material, only the performance of the two matched groups was compared. This comparison was made on the basis of six weekly tests given after each period of instruction and a final examination administered after the 6-week period. There was no significant difference in intelligence or arithmetic achievement for the two groups before instruction, but the face-to-face group had a slightly higher score in intelligence and arithmetic achievement.

Results.—There was no significant difference between the scores of the combined tests and final examination for the two methods of instruction, but the raw score averages did favor the face-to-face group. There were no significant differences in learning between methods of instruction for sex, intelligence, or previous arithmetic achievement. As measured by the difference in the sum of the weekly tests and the final examination, the TV-taught group forgot significantly more than the face-to-face taught group.

Conclusions.—TV is an equally effective, compared to face-to-face, means of instruction in teaching slide rule operation.

12. ANDERSON, KENNETH E., and others. "Toward more effective use of sound motion pictures in high school biology." *Science Education* 40 (1956), 43–54.

Problem: Comparative effectiveness of film and face-to-face teaching and face-to-face teaching alone.

Sample: 1,354 high school students in 60 schools.

Subject taught: High school biology.

Key variables: Learning, face-to-face teaching, film teaching, film teaching with supplementary face-to-face instruction.

Twenty science teaching films were selected by authors to be in conformity with criteria by W. Edgar Martin of the major principles of biological sciences for importance to general education. Three groups of students were selected from Kansas high schools. Group I was a control group which was taught biology face-to-face by their regular instructors in the way they regularly teach the course. Group II saw the 20 films as part of the regular biology instruction, but no effort was made by the classroom teachers to point out special parts of the films. Group III saw the films as part of regular instruction, but classroom instructors pointed out and stressed, according to material supplied with the films by the authors, the principles covered or stressed in the films.

Students were pretested on the Nelson Biology Test, Form *Am*, before instruction began, posttested on the Nelson Biology Test, Form *Bm*, and given the Terman-McNemar Test of Mental Ability, Form *C*, during the middle of the year.

Results were analyzed by analysis of covariance, adjusting for intelligence, and by comparison of posttest and pretest variances. The authors concluded that (1) holding intelligence constant, there were no significant differences among the methods of instruction, (2) adjusting for intelligence, a significant difference favoring the students taught by films plus stressed principles was noted for high- and low-ability students, but there were no significant differences for middle-ability students; and (3) the greatest increase in variance from pretest to posttest occurred with the students taught by films plus stressed principles.

The authors state that film producers should provide a description of the principles, according to Martin's criteria, that are stressed in each film.

13. ANDREWS, JOHN J. "High school algebra via television." *Mathematics Teacher* 53 (1960), 376–380.

Problem: Effectiveness of TV teaching.

Sample: 464 students.

Subjects taught: Intermediate high school algebra, advanced high school algebra.

Key variables: Learning, TV teaching, teacher opinions.

Students in 23 schools received instruction via open-circuit TV. Telecasts were 30 minutes long for 4 days a week. Followup sessions were presented face-to-face at the schools immediately after telecast.

Achievement results.—At the end of each semester an objective test was given to all students. The intermediate algebra class median score was the 60th percentile on the Garman-Schrammel Algebra Test. The advanced algebra median score was the 90th percentile on the Blyth Second-Year Algebra Test.

Opinion questionnaire results.—(1) *Liked best* in the experiment was (a) same outline used for all schools, (b) TV lesson required more student attention, and (c) all students received identical instruction, and (2) *liked least* about the experiment was (a) no personal contact between TV teacher and students, and (b) unable to ask questions of TV teacher during program.

Study also contains description of project and its administration.

14. ASH, PHILIP, and B. J. CARLSON. The value of note-taking during film learning. SDC 269-7-21. *Instructional Film Research Reports*. Port Washington, Long

Island, N. Y.: U. S. Naval Special Devices Center, 1951.

Problem: Effect of note-taking during film viewing on learning from film.

Sample: 216 freshman college students.

Subjects taught: High altitude flying, ocean survival, and safety.

Key variables: No film viewing; film viewing only; film viewing and note-taking; film viewing, note-taking, and review sessions; scores on test of film content.

In the study, 216 freshman college students were divided at random into four equal groups. One group was shown two films and tested on the film content immediately after viewing. The second group was shown the film, took notes during the film, and tested immediately after viewing. The third group saw the film, took notes, reviewed their notes for 10 minutes, turned in their notes, and then took the test. The fourth group did not see the film, but took the test.

The results showed that the students learned from the films. The average percent of test items correct for the three groups that saw the films was 60 percent with 30 percent for the no-film group. The film-only group earned the highest average score of the three film groups as shown by the following:

Group	*Percent—*	
	Flying	*Survival*
Film only	[1] 61.8	71.7
Film + notes + review	60.7	63.0
Film + notes	57.6	59.1

[1] Significant at .001 level.

Authors concluded that note-taking interfered with learning because films did not have pauses and repetition necessary for note-taking.

15. ASH, PHILIP, and NATHAN JASPEN. Optimum physical viewing conditions for a rear projection daylight screen. SDC 269-7-37. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1953.

Problem: Defining viewing parameters of a small motion picture screen.

Sample: 721 trainees at Great Lakes Naval Training Center.

Subject taught: Breechblock assembly for 40 mm antiaircraft gun.

Key variables: Angle of view, distance from screen, room illumination.

To determine the most effective placement of students in front of a rear screen daylight projection device for viewing an instructional film, 721 trainees were taught the assembly of a 40 mm antiaircraft gun breechblock.

The screen of the projection system is 13" x 18" made of special plastic material which will allow for wide viewing angles. Previous viewing standards for conventional front screen projection had been established by the Society of Motion Picture and Television Engineers as having no seats farther away from the screen than six times the distance from center to the edge of the screen.

To study the effect of angle of view and distance from the screen a special viewing room was set up. Arcs were drawn at 6-foot intervals from the projector, set in a corner, and radii were extended at intervals of 0° through 60°. Seats were arranged along these arcs. The viewing area was therefore a pie-shaped sector, one-sixth of a circle. In all, 50 seating positions were studied.

The same film on the assembly of the breechblock was shown to all trainees. One-half of the 721 men were tested under daylight conditions and one-half under darkened room conditions. An average of seven men for each position for each condition of lighting was available.

Following the film showing, the men were directed to testing stations at long tables arranged in the room. Each table had four to six test stations where a breechblock, set-up photograph, stop watch, pencil, and oil rag were placed.

Proctors, assigned to each station, were trained to set up disassembled breechblocks in a standard manner, operate stopwatches, and record data.

When trainees reached the test stations, a signal to begin assembling breechblocks was given. When a man completed assembly or the time allotted for the completion was past, the test was stopped and scores for correct assembly given.

Results.—The authors found a downward trend for correct assembly as angle to receiver and distance from receiver increased. They also found that in the best viewing areas, daylight operation resulted in better and faster assemblies, but as viewing distance and angle increased, performance was better under conditions of darkness.

The optimum area for viewing this device was a cone 60° wide and 18 feet deep (12 screen widths). Performance of those who sat in this area was significantly better than those who sat outside this area.

In the optimum area, daylight operation is best, but outside this area, darkness is best. Therefore, if a substantial part of the audience is outside, the optimum viewing area of the room should be darkened. If the optimum area is to be extended, increases should be in angle to screen rather than distance to the screen.

16. ASH, PHILIP, and NATHAN JASPEN. The effects and interactions of rate of development, repetition, participation, and room illumination on learning from a rear projected film. Technical Report SDC 269-7-39. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1953.

***Problem*: Effect of viewer participation on learning from instructional films.**

***Sample*: 1,100 trainees at Great Lakes Naval Training Center.**

***Subject taught*: Assembly of the breechblock of the 40 mm antiaircraft gun.**

***Key variables*: Rate of development of content, room lighting, repetition, viewer participation, and viewing.**

In this study which undertook to investigate the effect on learning of four variables in film representation, 1,100 trainees were taught how to assemble the breechblock of a 40 mm antiaircraft gun by an instructional film. Two versions of the film were used, the first presenting the step-by-step assembly at a rapid pace, the second the assembly at a slow pace. The film's first version running time was 3 minutes, the second ran 4½ minutes.

To study the other effects, three variables of film presentation were used: (1) *Amount of light* in the room was varied from full darkness to bright daylight. (This technique was possible with the rear screen because the projection screen is quite bright.) (2) The films were shown one, two, or three times to study the effect of *repetition.* (3) *Audience participation* was studied by allowing some groups to follow the film showing of the correct assembly with an actual breechblock in their hands while others had to wait until the film was over to try and assemble the actual breechblock. Altogether, 20 possible combinations of the four treatments were tested.

Trainees were divided into groups of about 60 and shown the film under the appropriate combination of variables. After the film showing(s), they went to tables in the viewing room and assembled an actual breechblock.

Trainees were scored on the amount of time necessary to make a correct assembly; therefore there were two scores for each subject, a passing or failing score and the amount of time necessary for completion of the assembly if the student passed. Data analysis was by analysis of variance of the two scores for 20 separate interactions.

The authors summarized the findings for each variable as follows:

> *Rate of development.*—The slow film was appreciably better than the fast film in all comparable conditions. The rate of development had a significant effect on repetition and participation.
>
> *Room illumination.*—A dark room resulted in significantly better performance than a light room in all comparable conditions. Room illumination did not appear to interact with other variables, but it did have an effect on distance from the screen.[1]
>
> *Participation.*—Participation was helpful with the slow film and detrimental with the fast film. The positive contribution of par-

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[1] This study reconfirms a relationship between illumination, distance from screen and learning the same authors noted in another study. This relationship, briefly stated, is that learning is high in a well-lighted room using a rear projection screen only when viewers are not farther from the screen than 12 times the width of that screen. If viewers are farther than 12 screen widths away, a darkened room results in more learning. See Summary No. 15.

ticipation was significantly greater with slow film than the negative contribution with the fast film.

Repetition.—For the slow film significant contributions for repetition were found only for the second showing. The third showing of the slow film had little effect. With the fast-paced film three showings were necessary for a significant increase in learning and the second showing resulted in only slightly better performance.

The authors implied that (1) a slow rate of content development is more helpful to learning than a fast rate, (2) repetitive showings of a film increase learning to a point, (3) participation by viewers increases learning provided development is paced slowly enough to allow participation. Attempted participation with a fast film impedes learning.

17. ASHER, JAMES J., and RICHARD I. EVANS. "An investigation of some aspects of the social psychological impact of an educational television program." *Journal of Applied Psychology* 43 (1959), 166–169. (See also "An investigation of a group of social psychological factors related to the impact of an educational television program." *Dissertation Abstracts* 18 (1958), 1090.)

Problem: To explore the viewer's change in attitudes after viewing an educational television program, as a function of viewer rigidity, prestige of the agency transmitting the program, and adaptation level.

Sample: Undergraduate college students ($N=113$), some who believed the program to be a network production ($N=47$), others who believed the program to be a local broadcast ($N=36$), and the control subjects ($N=30$).

Subject taught: The program communicated through modern dance how different cultures react to puberty changes in girls.

Key variables: Attitude changes after an ITV presentation, viewer rigidity, prestige of the message's source, and adaptation level.

In this study three hypotheses were tested. The first hypothesis was that the greater the rigidity or "close mindedness" of the audience, the less change in attitude from an educational television program.

This idea was tested by relating a measure of "close mindedness" (Rokeach's dogmatism scale) to attitude changes (as measured by a semantic differential), when undergraduate college students ($N=83$) viewed an educational television program on how different cultures react to puberty changes in girls. Generally, the measure of "close mindedness" did not correlate with attitude changes produced by the program.

The second hypothesis that there may be greater attitude change in the audience as a function of higher prestige if the viewers believed that the program had been produced by a television network rather than a local educational station was not supported. Whether the viewer believed the program to be network or locally produced, there was a significant change in the same set of attitudes.

The third hypothesis stated that since the program did not have the quality of a network production, viewers who believed that the program was local would be more satisfied than viewers who believed the program to be a network production. This notion was based on adaptation level theory which would predict that less deviation from what is expected will produce positive feeling. This hypothesis was supported.

18. BAILEY, HERBERT STERNBERGH. "Teaching physics on closed circuit television." *Dissertation Abstracts* 19 (1959), 1947.

Problem: Determine the effectiveness of learning physics by television and to determine student attitudes toward an ITV physics course.

Sample: 40 university students taking physics.

Subject taught: General physics.

Key variables: ITV and face-to-face presentation; achievement and attitudes.

Subjects were matched by grade-point average and sex, and were randomly assigned to a television or nontelevision group. A 78-item multiple-choice pretest was administered. Means on this pretest did not differ significantly. The same test was also incorporated into the final examination. Posttest means were not significantly different between the two groups. Differences in achievement scores between the groups were not significant. As measured by scores on the physics achievement test, students achieved as much by closed-circuit television as they did by face-to-face methods. The course made maximum use of available visual materials.

Student reactions on an attitude questionnaire given at the end of the course were not favorable to ITV. Students felt that achievement, retention, and final grades would be lower in the television section. They disagreed that ITV had fewer distractions and helped them concentrate better. They were about equally divided on whether they thought television allowed them to view demonstrations more closely. Thirteen of 21 indicated they disliked the course; 16 indicated they preferred a face-to-face class, and 12 indicated they would prefer ITV to a large class of several sections. Part of the students' unfavorable reaction may have resulted from technical difficulties—poor sound and bad quality pictures.

19. **Barrow, Lionel C., Jr., and Bruce H. Westley.** "Comparative teaching effectiveness of radio and television." *Audio-Visual Communication Review* 7 (1959), 14–23. See Westley, Bruce H., and Lionel C. Barrow, "Intelligence and the effectiveness of radio and television." *Audio-Visual Communication Review* 7 (1959), 193–208.

20. **Beatts, Patrick M.** "Report on instructional closed circuit television for 1957." IBM, Poughkeepsie, New York, Feb. 1, 1957. *Audio-Visual Communication Review* 7 (1959), 306. (Abstract).

Problem: Determine the teaching effectiveness, student and teacher acceptance, efficiency, and other aspects of closed-circuit television instruction.

Sample: Customer engineering students.

Subject taught: IBM machines.

Key variables: Students' grades, students' and teachers' questionnaire responses, and students' attitudes over time.

It was concluded that teachers and students became increasingly more favorable to instructional television, and that a reduction in the class time spent was feasible. A secondary result was both the observed and subjectively reported improvement in preparation and teaching ability in the conventional classroom of the instructors who used TV.

21. **Becker, Samuel L.** "The 'meaning' of ITV: A study of student expectations." *NAEB Journal* 22 (1963), 25–31.

Problem: Determine expectations of students toward ITV and attitudes toward other university experiences.

Sample: University of Iowa 594 entering freshmen; 190 freshmen, 280 sophomores, 276 juniors, and 183 seniors at the end of the year.

Key variables: Attitudes, attitudes over time, and year in school.

There were 594 entering freshmen that took a semantic differential instrument ("University Image Test") having 18 concepts (education, professor, courses, library, dates, athletics, and others) and 14 7-point bipolar adjectives. At the end of the year 929 students took the test. None of the students were enrolled in a college ITV course.

Scores on the concept Use of TV in College Courses were consistently lower than scores on concepts such as education, professor, or library.

When all adjectival scales were intercorrelated, two clusters were found: an intellectual-utility cluster (intelligent-stupid, high standards-low standards, adult-childish, useful-useless, and practical-impractical) and warmth cluster (pleasant-unpleasant and friendly-unfriendly).

Students' rankings of all the concepts, except television, on the intellectual-utility and warmth clusters tended to become more unfavorable with greater university experience. For the television concept, the favorable to unfavorable trend from the freshmen to seniors was not evident.

In the intellectual-utility cluster, the television concept correlated at least .57 with all other concepts except coaches. In the warmth cluster, it correlated most closely with regulations, the University of Iowa, Harvard, education, grades, and the liberal arts dean. It correlated negatively with dates, athletics, dorms, and degree.

22. **Becker, Samuel L.** "The relationships of interest and attention to retention and attitude change." USOE Project No. 739. Iowa City, Iowa: University of Iowa, 1963. *Audio-Visual Communication Review* 12 (1964), 110–111. (Abstract).

Problem: Determine the relationship among interest, GSR, retention, and attitude change.

Sample: 90 fifth-grade students.

Subjects taught: The Constitution and the story of the United Nations.

All students individually saw the two recorded 30-minute TV programs. Students in group I pushed a switch when they thought the program was "dull" and released it when they thought it was "interesting." Students in group II checked a paper chart every 30 seconds to indicate interest. Group III students were tested for galvanic skin response (GSR). All students took a factual test before and after viewing each program.

The push-button and pencil-and-paper groups showed similar profiles but neither had any relationship to the GSR profile. Retention and the three measurements were unrelated. The GSR scores showed more relationship to attitude and attitude change than retention.

23. **Becker, Samuel L., Rhodes Dunlap, and John C. Gerber.** *A comparison of three methods of teaching modern literature.* Iowa City: The State University of Iowa, June 1957. (Mimeographed).

Problem: Determine the attitudes of students and teachers toward the use of ITV, and determine the relative learning from ITV and face-to-face presentations.

Sample: About 360 students in the discussion section, about 150 students in the lecture-discussion section, and 73 students in the ITV section.

Subject taught: Modern literature.

Key variables: Attitudes, learning (final grade in the course); ITV and face-to-face presentations.

Discussion sections of about 30 students met 4 days a week with one teacher. Lecture-discussion sections met twice a week for lectures, and twice a week in groups of about 20 for discussion. The discussion leader was usually not the lecturer. The television-discussion sections met 2 days a week for a lecture, and 2 days a week in which part of the group discussed in the studio with the instructor, and the rest of the group watched. Viewing students had a talk-back system available, but experimental conditions were such that discussion with any but members of the immediate panel was in effect impossible.

After the course, students completed an attitude questionnaire. Generally, the television group was least favorable to the course and the discussion group was most favorable. Television students tended to be more favorable toward using ITV than did students in the other two groups. Discussion students felt they learned more and were stimulated to more thought than television students. Fifteen of 20 modern literature instructors filled out an attitude questionnaire. This faculty group was more negative toward a "lecture only" course than students were.

There were no significant differences among scores of students in the three groups on four multiple-part essay questions (final examination grades).

24. **Becker, Samuel L., and others.** *Communication skills. An experiment in instructional methods.* Iowa City: The State University of Iowa, August 1958.

Problem: Determine the relative effectiveness of face-to-face, assigned readings and kinescope instruction.

Sample: 582 students in the main course.

Subject taught: Communication skills.

Key variables: Learning and attitudes; face-to-face, assigned readings, and kinescope instruction presentation.

Students were randomly assigned to one of three treatment groups: face-to-face instruction, a bibliography group which met three rather than four hours a week and which read a list of assigned material, and a kinescope group which saw 28 half-hour kinescopes presented by "experts," in addition to about three face-to-face lectures each week. Kinescopes were projected as motion pictures. Only the first two treatments were available for the accelerated students who had received higher scores on an initial placement examination battery.

All students in the accelerated course filled in an attitude questionnaire near the end of the first semester, and students in the main courses filled in a similar questionnaire at the close of the second semester. Communication skills instructors filled in a questionnaire to ascertain which method they believed was most beneficial and why.

For the main course students, analysis of covariance showed significant instructor differences for all but the vocabulary measures. Using either combined scores or individual scores as the unit of measurement, *F* ratios indicated no significant differences among treatments on the English composition, reading, vocabulary, communication skills principles, or Brown-Carlsen listening tests, an expository theme, or an argumentative speech. In addition, analyses of covariance in a treatment by levels design (dividing percentile rank on the entrance composite examination into four levels) on the principles, speech, theme, and listening examinations after the course indicated no significant *F* ratios for methods of instruction or interaction for the principles, speech, or listening examinations. For the levels analysis of theme scores, a significant *F* ratio was found between levels and methods of instruction (face-to-face, bibliography, and kinescope). Within all four examination score analyses, significant differences were found among the four levels.

Analysis of variance on the attitudes toward communication measures at the end of the course indicated no significant differences among instructors within each method or among methods of instruction. Students in each of the three treatment groups favored their method of instruction, generally regarded it as easier than the other two methods, and felt they would gain the most from it.

Almost no correlation was found between pre-attitude scores and achievement gain scores. Communication skills instructors generally felt students made the most progress under the normal face-to-face condition.

25. **BENNER, CHARLES P., and CURTIS A. ROGERS.** "A new plan for instructing large classes in mathematics by television and films." *Mathematics Teacher* 53 (1960), 371–375.

Problem: Comparative effectiveness of TV, face-to-face, and film teaching.

Sample: 1,132 students in four semesters.

Subject taught: Plane trigonometry.

Key variables: TV teaching, film teaching, face-to-face teaching, learning.

Students received instruction by viewing two televised lectures on open-circuit TV each week, plus two optional repeat showings of the lessons as film, and a 1-hour a week face-to-face discussion section. All TV programs originally were made on the campus as film lessons and shown later over the TV station. Student achievement was measured on two major and two minor examinations given during the semester.

As an evaluation technique, the authors found that a preliminary observation of IQ scores, comprehensive reading test scores, and course letter grades of 250 students who had taken the course indicated a distribution of A to F grades in the course for the range of IQ and reading scores. The Educational Testing Service Cooperative Plane Trigonometry Test was administered for four semesters with norms of 55.4, 56.9, 57.4, and 57.2 respectively and the national norm is 57. For comparative performance with face-to-face taught students the following data were tabulated for one semester.

Method of instruction	*N*	*Percent given in Grades—* *A*	*B*	*C*	*D*	*F*
TV	80	10	24	42	15	9
Face-to-face	108	14	21	31	18	16

Study also reports on the development and administration of the project from inception in 1957 to spring 1959.

26. **BENSCHOTER, REBA PATTERSON, and DON C. CHARLES.** "Retention of classroom and television learning." *Journal of Applied Psychology* 41 (1957), 253–256.

Problem: Comparative effectiveness of TV and face-to-face teaching measured in terms of long-term retention.

Sample: 83 students.

Subject taught: Psychology.

Key variables: TV teaching, face-to-face teaching, combined face-to-face and TV teaching, TV recording teaching, retention measured over 3 years, learning.

This study, based on Husband's[1] experiment of 1953, attempted to analyze 3-year retention of psychology subject-matter of students taught by TV and face-to-face methods. A readministration of the final examination given in 1953 was compared with original scores to give a measure of retention.

Results.—(1) A comparison of the main differences among the four groups taught, TV, face-to-face, studio (combined TV and face-to-face), and kinescope recording (used as film), showed no significant difference in amount remembered by the groups (mean differences were −12.9, −11.6, −10.3, and −14.4 respectively). (2) When the campus students were categorized according to number of psychology courses taken since original instruction in 1953, there was a significant interaction. Those who had taken three or more psychology courses scored higher on the retention test than those who had taken no, one, or two classes in psychology. When TV-taught students only were categorized on the basis of number of psychology courses taken, there was little difference in retention between those with few courses and those with three or more courses. (3) Students with lower original test scores lost less over the 3 years than students with higher original test scores.

Conclusions.—Students taught by TV retained their material over 3 years as well as students taught by face-to-face methods of instruction.

27. BERGER, EMIL JOSEPH. "An investigation of the effectiveness of televised presentations of self-contained television-adapted lessons on enrichment topics in mathematics." *Dissertation Abstracts* 23 (1962), 1552.

Problem: Determine the relative effectiveness of televised and face-to-face presentations of enrichment mathematics topics, and determine any differences by ability level.

Sample: 154 ninth-grade algebra students from five classes, 57 tenth-grade geometry students from two classes, plus 58 tenth-grade geometry students from two classes (control group).

Subject taught: Mathematics.

Key variables: Ability, learning, television, and face-to-face presentation.

Eight lessons were prepared. Before and after each lesson, subjects took a multiple-choice achievement test.

Students in television sections had significantly higher scores on the posttest than they had on the pretest, for each lesson.

Using the ninth-grade pupils, an analysis of covariance adjusted for initial scores indicated that homogeneously grouped high-ability students had significantly higher scores than did high-ability students in heterogeneous classes in three of the seven lessons presented for this part of the experiment. Low-ability students in heterogeneous classes had significantly higher scores than did low-ability students in homogeneous classes for one lesson.

Using the tenth-grade pupils for seven lessons and pooling achievement scores, an analysis of variance showed that students in the face-to-face sections had significantly higher scores than did students in the ITV sections on two lessons, and ITV students had significantly higher scores on one lesson.

28. BLAIN, BERYL BRUCE. "Effects of film narration type and of listenability level on learning of factual information." Doctoral dissertation, Indiana University, Bloomington, 1956. *Audio-Visual Communication Review* 4 (1956), 163–164. (Abstract).

Problem: Determine the relative effect of two types of film narration (expository and dramatic) on learning.

Sample: 330 fifth-grade pupils from six schools, and 328 eighth-grade pupils from three schools in Pueblo, Colo.

Subject taught: The Monarch butterfly.

Key variables: Expository and dramatic narration, learning.

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[1] R. W. Husband. "Television versus classroom for learning general psychology." *American Psychologist* 9 (1954), 181–183.

Four prints of the same film were made and a magnetic stripe was put on each. An expository narration of two difficulty levels was placed on two films and a dramatic narration on two others.

All pupils took a 51-item test on the film content before and after the showing, and again a week later. Analysis of variance and covariance indicated no significant differences in scores of fifth graders in listenability levels or narration types. Eighth graders knew more, learned more, and retained more than fifth graders, as determined by the scores on content tests. Eighth graders learned more from the expository than the dramatic narration.

29. BLANCHERI, RAYMOND L., and IRVING R. MERRILL. The step presentation of dental technic instruction. Theo. S. Grant and Irving R. Merrill, *Television in Health Sciences Education*. USOE Project No. 064. San Francisco: University of California, San Francisco Medical Center, Sept. 30, 1963. p. 34–37. (Offset).

Problem: Determine the relative effectiveness of teaching crown preparation by ITV by one large step or several smaller steps.

Sample: 70 second-semester freshman dental students.

Subject taught: Making a crown preparation on an ivorine tooth.

Key variables: Step performance and whole lecture performance arrangement; time and quality of laboratory work.

Two groups were equated on mean scores of four dental morphology test scores (lab products). The inclusive group watched the entire ITV presentation and then prepared an ivorine tooth. The step group received step one, the mesial cut, and then performed that step, then received the second step, and so on for nine steps of about 5 minutes each.

The identification of students was concealed during the scoring of lab work products to avoid criterion contamination.

The *t*-tests indicated the step-presentation group did their lab work (test cases) in significantly less time than the inclusive presentation group (.01 level). There were no significant differences between the two groups in the quality of students' lab work.

30. BOBREN, HOWARD M., and SHELDON L. SIEGEL. "Student attitudes toward closed-circuit instructional television." *Audio-Visual Communication Review* 8 (1960), 124–128.

Problem: Compare students' learning and attitudes toward ITV and face-to-face instruction.

Sample: 112 male students at the University of Illinois.

Subject taught: Engineering.

Key variables: Learning, attitude; ITV and face-to-face presentation.

Students were assigned to face-to-face or ITV presentation treatments. Sections were taught by different instructors. Face-to-face students met in groups of 12 for their classes; ITV students ($N=60$) assembled in one room to hear the ITV lecture, and then broke up into smaller groups.

At the end of the course all students took a semantic differential instrument and rated "teaching where the instructor is in the classroom," "teaching where the instructor is on television," "this course," and "your instructor(s) in this course" on 11 polar adjective scales.

There were no significant differences in midterm or final examination grades between the two groups. The ITV group reported they spent more [study] time outside of class than the face-to-face group. The television group rated the concept "this course" as less pleasant (.001 level), less clear (.001), less fair (.01), less good (.01), less meaningful (.05), less successful (.001), less wise (.01), less understandable (.001), less interesting (.05), and less simple (.05). The television group rated the concept "your instructor(s) in this course" as less fair (.001), less valuable (.001), less clear (.01), less good (.05), less successful (.001), less meaningful (.01), less wise (.001), and less interesting (.05). Other scales for these two concepts showed no significant differences. There were no significant differences on any of the adjectives for the other two concepts, except for "teaching where the instructor is on television," where the

ITV group rated it less understandable (.01 level).

31. BOONE, W. F. *Evaluation of the U.S. Naval Academy educational television as a teaching aid.* Annapolis: U.S. Naval Academy (7010 7–26–54), 1954. (Duplicated). [Prepared from abstract in Kumata, Hideya. *Inventory of Instructional Television Research.* Ann Arbor, Mich.: Educational Television and Radio Center, 1956. p. 38–40.]

Problem: To evaluate the U.S. Naval Academy's educational TV as a teaching aid.

Sample: Six battalions of midshipmen at U. S. Naval Academy.

Subject taught: Electronics.

Key variables: TV instruction, face-to-face instruction.

Two courses, *Transients in Electrical Circuits* and *Wave Shaping Circuits,* taught midway in the second term, were chosen as subject matter. Each course was 25 minutes long. The battalions of about 140 men each were split, one-half receiving TV instruction, the other receiving face-to-face instruction by regular instructors. For the second course, the groups which received TV instruction were taught in the regular fashion while the face-to-face groups were exposed to TV.

Each student was given a prognostic pretest of 10 minutes to determine initial learning level. Immediately after the lecture, the students were given a 15-minute achievement test. All questions were of the multiple-choice type. The pretest contained 10 items, the achievement test contained 15 items covering both the material on the pretest and material covered in the lecture. Six weeks later, the achievement test was readministered.

Analysis of covariance was used. As measured by the pretest scores, the TV group was not as well prepared as the face-to-face group for the class *Transients in Electrical Circuits.* After exposure, the TV group showed a significant superiority beyond the 1 percent level over the face-to-face group. The TV group still scored higher on the retention test, although the difference between the two groups was not significant. In a comparison of regression coefficients, the TV groups had the smaller regression coefficients for both the achievement and retention tests. "This would seem to indicate that those instructed by TV had less dependence on their initial amount of knowledge. The poorer men gained more from TV than a comparable man gained from his regular instructor."

For the course *Wave Shaping Circuits* the pretest scores again showed the face-to-face group better prepared than the TV group. The difference again was not significant. In the immediate posttest, the face-to-face groups still remained superior. The difference between the face-to-face and TV groups on the achievement test was significant at the 5 percent level. By the time of the retention test, however, this difference was obliterated. The TV group, in fact, did better than the face-to-face group, although the difference was not significant. Regression coefficient comparisons showed that the TV group had a higher regression coefficient than the face-to-face group. The retention test showed a reversal, the TV group having a lower coefficient than the face-to-face group.

32. BRANDON, JAMES ROGER. "The relative effectiveness of lecture, interview and discussion methods of presenting factual information by television." *Speech Monographs* 23 (1956), 118. (Abstract of doctoral dissertation.)

Problem: Determine relative effectiveness of lecture, interview, and discussion methods of instruction.

Sample: 144 college students (72 men, 72 women).

Key variables: Lecture, interview, and discussion instruction methods.

Nine instructional segments, each 10 minutes in length, were prepared on kinescope recordings by three speakers. Each speaker presented one of three different topics in three formats: (1) as a lecturer, (2) as an expert participant in an interview, and (3) as a participant in a discussion with another expert and a moderator. From these nine segments, 18 half-hour programs were arranged. Each program featured all three speakers and all three formats, but was arranged in different order of presentation.

Students were shown each program and then given an information and attitude questionnaire. Scores were converted into normalized scores and analyzed by analysis of variance.

The author concluded that the interview and discussion formats were more interesting than the lecture presentation in the course of the whole experiment. Women ranked lectures lowest in interest for all presentations, but the men ranked one lecture more interesting than interview or discussion. The author also concluded that there was no significant difference in the amount of information communicated by any of the presentation formats or arrangements. Scores for the women were higher on the posttest information questionnaire, and also on the information pretest. The least information was learned in the first 10 minutes of presentation and the most information was learned in the middle 10 minutes of presentation. A low correlation existed between interest and amount of information retained.

33. BROWN, JAMES I. The Importance of Structured Outside Reading Assignments. *College and Adult Reading,* II, Second Annual Yearbook, North Central Reading Association, 1963. (Abstracted in part in *NAEB Journal* 21 (March 1962), 5–7.)

Problem: Effectiveness of structured outside class reading assignments on improving learning from instructional television.

Sample: Not given.

Subject taught: Reading.

Key variables: Gains in reading rate and comprehension for varying degrees and types of outside reading assignments, amount of structuring of outside reading assignments.

Part of the freshman communications program at the University of Minnesota involves the instruction of four communications skills of reading, writing, speaking, and listening. All incoming students are given a test of communication skills and assigned to a remedial section in any skill in which they are deficient. Historically, these special skills classes, also available to students on an elective basis, have produced highly significant gains in skill improvement for students. The author reports that below-average students have made an average percentile rank gain of 60 after instruction as measured on the Diagnostic Reading Test. During the years of this program's administration, various reading aids were introduced in the reading course. Students were tested to determine the comparative effectiveness of these aids. The students who showed the greatest gains in reading were those using a structured type of workbook as a reading aid. The move was made in the regular university face-to-face courses to a less permissive and more structured type of reading assignment.

During the period of adoption of the structured assignments, students were taught by five methods of instruction, a regular 10-week class, a summer 5-week class, a 17-week extension class, an industrial 12-week class, and an open-circuit television course of 12 weeks. The summer, extension, industrial, and television classes featured less face-to-face instruction time than the regular face-to-face taught university campus course. Increasing the structure and frequency of the outside class reading assignments helped to keep the four other courses comparable in learning to the University course.

First TV course.—The Minnesota Mining and Manufacturing Company was the patron for the first TV course over station KTCA-TV in 1960. This course featured some degree of structuring of the outside reading assignments. There were instructions for having the viewers make a preliminary and final check of flexibility, 47 selections to be read during the 12 weeks of instruction, and space for entering the pre- and posttest results.

At the end of the first series of programs, students who did three supplemental readings a week made, on an average, six times the gain in reading comprehension that students reading only one or fewer supplemental readings a week had made. The students who read more outside the class made a gain in rate five times greater than those who did not read outside class or read only one supplemental assignment each week.

Second TV Course.—Based on the results of the first course, during the second course the number of assigned readings was increased from 47 to 60. An 11-page reading assignment sheet package was given to all students enrolled. Students were told what to do, how to do it, and when and where to report the results. In the previous course students were given a larger degree of permissiveness.

Students in this TV course did better than students in the previous TV course both in reading rate and comprehension gains, and, in fact, did better than students taught face-to-face in the 12-session industrial course, but gained less than the students in the 17-session extension course.

Conclusions.—The author concludes that highly structured outside of class reading assignments can result in higher gains in reading rate and comprehension than can permissive assignments. The author raises the possibility that the structuring of the assignments may introduce a purpose other than to read more efficiently, specifically that of completing the assignments. This assignment completion task may introduce fear into some students of an attempt to increase rate because of a loss of comprehension. Students were taught how to determine the loss in comprehension for increase in rate to establish their own point of diminishing returns for rate increase. The author suggests further research be conducted into the role structured assignments play in producing gains in more efficient reading.

34. BRYAN, EDWARD F. A *comparative study in the teaching of high school chemistry and physics.* USOE Project No. 447. Oklahoma City: Oklahoma State Department of Education, September 1961. (Mimeographed).

Problem: Compare achievement and attitudes of students receiving physics and chemistry by ITV and correspondence study, ITV and college students' visits, and ITV and both correspondence study and college students' visits.

Sample: 19 Oklahoma schools with 128 high school students in chemistry and 16 schools with 97 students in physics.

Subjects taught: Chemistry and physics.

Key variables: Television plus correspondence study; those who receive instruction by television plus personal visitation by college students preparing to teach; and those who receive instruction by television plus both correspondence courses and personal visitations by college students preparing to teach.

The chemistry sample had 56 high school students in ITV and correspondence, 41 in ITV and visits, and 31 in ITV and both correspondence and visits treatments. The physics sample had 23, 42, and 32 in the same three treatments.

All students took the Read General Science Test as a pretest, and an attitude questionnaire (constructed from questionnaires used by Neidt and French and Hibbs). Chemistry students took the Cooperative Chemistry Test as a posttest; physics students took the Ohio Every Pupil Physics Test as a posttest. Physics students saw the Harvey White Physics course and chemistry students saw the John Baxter chemistry course. Both were offered as films over television.

An analysis of variance on the Read pretest scores indicated that the chemistry ITV plus visits group achieved significantly lower scores than the ITV plus correspondence group (.02 level). This was the only significant difference found initially.

Analysis of variance on the Ohio Physics test indicated no significant differences among the three groups in (posttest) achievement scores. Analysis of variance on the ACS–NSTA Cooperative Chemistry Test scores indicated that the ITV plus correspondence plus visits group achieved significantly higher scores than either of the other two groups.

Analysis of covariance (holding Read scores constant) on the chemistry groups found regression coefficients of .48 and .62 for within and between groups, respectively.

Analysis of variance indicated chemistry students felt significantly stronger about the questionnaire statements (.01 level) than did physics students.

35. BUCKLER, WILLIAM E. "A college English teacher looks at television: Composition." *Journal of Educational Sociology* 31 (1958), 346–352.

Problem: Comparative effectiveness of television and face-to-face instruction.

Sample: Not given.

Subject taught: College English composition.

Key variables: Cooperative English Test, Cooperative English Test of Literary Composition, student themes, TV teaching, face-to-face teaching.

A two-semester, six-credit hour course at Washington Square College of New York University was offered by closed-circuit television and face-to-face methods of instruction. TV sections met for 45 minutes of televised lecture and 30 minutes of face-to-face discussion twice a week. The same instructor taught both sections.

Performance for the first semester was compared on the basis of the Cooperative English Test and student themes; the second semester by the Cooperative English Test of Literary Composition scores and additional student-written themes.

There was no significant difference between methods of instruction for students in either section during the first semester, but the adjusted mean scores favored the face-to-face section. During the second semester high-ability students in the face-to-face section did significantly better than high-ability students in the TV section. During the first semester low-ability students in the face-to-face section did better, but not significantly, than the low-ability students in the TV section.

Students in the TV section did better second semester than first semester, the author thought, because the students had made an adjustment to TV teaching, the subject matter adapted better to TV presentation, and less time was spent during the second semester discussing the merits of TV as a means of instruction.

36. BUNDY, E. WAYNE. An experimental study of the relative effectiveness of television presentational techniques and conventional classroom procedures in promoting initial comprehension of basic verb form concepts in elementary Spanish. Detroit: University of Detroit, August 1959. [Mimeographed]. (Doctoral dissertation, University of Michigan, Ann Arbor, 1960.) (See also *Speech Monographs* 28 (1961), 92–93, and *The Impact of Educational Television.* Wilbur Schramm, ed. Urbana: University of Illinois Press, 1960. p. 125–142.)

Problem: Determine the relative effectiveness of television and face-to-face presentations in learning.

Sample: 38 Spanish I students at the University of Detroit.

Subject taught: Elementary Spanish.

Key variables: Television and face-to-face presentation; achievement.

Students were divided into two groups: face-to-face instruction and closed-circuit TV instruction on three critical basic verb-form concepts. The ITV presentation included the use of supers for emphasis. The same instructor taught both groups. After the first two concepts had been presented, the groups switched presentation methods for the third topic.

Statistical comparisons were made using three different tests. Of 24 comparisons made, 23 followed a consistent trend favoring television presentation techniques over conventional classroom procedures.

37. BURGER, ELIZABETH. "The use of television for inservice teacher training." *Dissertation Abstracts* 21 (1961), 2204.

Problem: Determine whether pupils taught by teachers receiving science subject-matter training by ITV learned as much as pupils taught by teachers not receiving subject-matter training.

Sample: 34 teachers and 1,039 fifth-grade pupils.

Subjects taught: Electricity and machines.

Key variables: Learning; teachers receiving ITV instruction or no instruction.

All teachers were given a *Science Guide.* Half the teachers also saw three half-hour ITV programs on science subject-matter before class time.

All pupils took pre- and posttests on electricity and machines, as well as a general ability instrument.

The *t*-tests indicated that pupils of teachers receiving the ITV instruction on electricity had significantly higher (.01 level) scores than pupils of teachers having no subject-matter instruction. There were no significant differences in scores of pupils of teachers receiving ITV instruction on machines and scores of pupils of teachers having no instruction on machines.

38. Capraro, Thomas C. "A study of the effects of class size, supervisory status, and two-way communication upon learning and attitudes of AFROTC cadets in a closed-circuit instructional television program." *Dissertation Abstracts* 17 (1957), 270.

Problem: Determine the effect of class size, proctor status and two-way communication on learning and attitudes toward ITV, and to determine the general pattern of cadet responses toward ITV.

Sample: 369 Air Force ROTC cadets taking Air Science II.

Subject taught: Air Science II.

Key variables: Class size, proctor status, two-way communication, cadet attitudes toward ITV over time, and learning.

To determine the effect of class size on learning and attitudes toward ITV, the total sample of 369 cadets was divided into groups of varying sizes from 19 to 110. An objective achievement instrument (two forms, $r=.55$ and $.57$) and an attitude questionnaire were administered. There were no significant differences between the various group sizes on learning or attitude toward television.

To determine the effect of proctor status on learning and attitudes toward ITV, four groups of 31 cadets each were selected. One group had a commissioned officer, one a cadet officer, one a fellow cadet chosen at random for each class meeting, and the last group had no proctor. Scores on an achievement test and responses to the attitude questionnaire revealed no significant differences between groups in learning or attitudes toward television.

To determine the effect of two-way communication on learning and attitudes, four groups of 30 cadets each were selected. Two groups had two-way microphones and two groups had no microphones. For this phase of the experiment, question-answer periods followed the lectures during which the experimental group could question the studio instructors. Scores on an objective achievement examination (two forms, $r=.71$ and $.74$) and responses to an attitude questionnaire designed to record reactions toward two-way communication and general reaction toward ITV revealed no significant differences between the groups in learning or in attitudes.

To determine the attitudes of cadets to ITV over a period of time, questionnaires from those cadets for whom complete attitude data was available were examined. These revealed a consistently favorable reaction to the television course.

39. Carner, Richard Leland. "An evaluation of teaching reading to elementary pupils through closed-circuit television." *Dissertation Abstracts* 23 (1962), 160–161.

Problem: Determine the effectiveness of teaching reading to fifth- and sixth-grade pupils by ITV, determine if ITV remains effective over time, if ITV reduces a need for instruction according to ability, and pupils' attitudes toward ITV.

Sample: All fifth- and sixth-grade pupils in Cortland public schools.

Subject taught: Fifth- and sixth-grade reading.

Key variables: Reading ability, attitude, face-to-face and television presentation.

All pupils took the reading section of the Iowa Tests of Basic Skills.

Superior readers made significantly smaller gains following ITV reading instruction than were made with face-to-face instruction the previous year. Average readers gained about the same under both conditions, and below-average readers made significantly higher gains from ITV. Average fifth-grade readers made as much improvement the second year of ITV reading instruction as they had the first. Superior readers receiving all reading instruction by ITV made as large gains as did superior readers who received part of their reading instruction by television and part by face-to-face instruction.

Pupils having an initially unfavorable attitude toward reading tended to become more favorable after the ITV reading instruction.

Teachers felt that superior and average pupils benefited most. This contrasts with scores on standardized tests which showed the below-average students to benefit most from ITV reading instruction. Teachers' expectations of ITV

reading instruction were greater than their final evaluations.

40. Carpenter, C. R., and L. P. Greenhill. *Instructional Television Research. Project No. One. An Investigation of Closed-Circuit Television for Teaching University Courses.* University Park: The Pennsylvania State University, July 31, 1955.

***Problem*: Determine the relative effectiveness of ITV and face-to-face presentations, and to determine students' attitudes toward ITV.**

***Sample*: See below.**

***Subjects taught*: Psychology, chemistry, and psychology of marriage.**

***Key variables*: Learning and attitudes; face-to-face originating room and ITV presentations.**

Achievement

Chemistry

Students were matched on college major and final grade in Chemistry 1, and assigned to ITV, originating room, or control groups. There were 103 students in the originating room, 93 in TV classrooms, and 147 in the face-to-face lecture group.

Four analyses of covariance (run on each of the four achievement test scores and controlling on Chemistry 1 grades) indicated no significant differences among the three groups. Kuder-Richardson (K–R) formula #21 *r*'s for the four achievement tests ranged from .80 to .92.

Psychology

Students were randomly assigned to treatements. There were 74 students in the face-to-face lecture group, 152 in TV classrooms, and 75 in the originating lecture room.

Four analyses of variance (run on each of the four achievement test scores) indicated no significant differences among the three groups, except for the second achievement test. For scores on the final examination, a significant (.05 level) *F* ratio was found between instructors. Reliabilities as estimated by analysis of variance for the four instruments ranged from .77 to .87.

Psychology of marriage

There were 37 students in the originating room and 97 students in TV classrooms.

Three analyses of variance (run on each of the three achievement test scores) indicated no significant differences between the two groups. Reliabilities as estimated by analysis of variance for the three instruments ranged from .62 to .73.

Attitudes

Generally, students in psychology, psychology of marriage, and chemistry felt they learned about the same with face-to-face instruction and ITV classes. Students in the psychology face-to-face lecture group tended to give that course more first ranks when compared with other courses than students in the originating room group who in turn gave it more first ranks than ITV students. The same order existed for how much students liked the course. There were no significant differences between control and experimental groups in the number of students signing up for Psychology 200. There was a significant instructor-and-treatment interaction. Students were found to be significantly less authoritarian (*F*-scale scores) after taking psychology than before.

41. Carpenter, C. R., and L. P. Greenhill. *Instructional Television Research. Report No. Two.* University Park, Pa.: Pennsylvania State University, spring, 1958.

***Problem*: Determine the relative effectiveness of ITV and face-to-face instruction on learning and on students' attitudes.**

***Sample*: See below.**

***Subjects taught*: Psychology, chemistry, elementary business law, meteorology, music appreciation, and introductory sociology.**

***Key variables*: Face-to-face and ITV presentation; learning, retention, examination questions on textbook or lecture, distance from lecturer, class size, sex, proctor supervision, talk-back, attitude, and attitude over time.**

Introduction

Throughout the study, analysis of variance and analysis of covariance were used where applicable. The level of significance adopted was .05. Assignment of students to treatments was random.

Learning and retention

There were 152 general psychology students that were taught by ITV, 74 having direct instruction and 75 in the studio.

There were no significant differences among groups on examination scores. A retention test given 218 days later to 114 students of the original group also resulted in no significant differences among groups.

A total of 588 chemistry students were divided into two sections. Students in each section were again divided into large lecture rooms or small ITV classroom subsections.

Analyses of covariance, controlling on Test of Developed Abilities in Science scores, indicated no significant differences between achievement test scores for face-to-face or ITV students of either section.

The 189 students in business law were divided into four groups: (1) ITV only, (2) originating lecture room only, (3) ITV for 2 weeks and then originating room for 2 weeks, and (4) originating room for 2 weeks and then ITV.

Analysis of variance indicated no significant differences among groups in achievement test scores.

In introductory sociology, 279 students were divided into ITV and originating lecture room groups. Examination scores were analyzed for questions covering the textbook and for questions covering the lecture.

Analyses of variance indicated no significant differences between face-to-face and ITV groups for either type of examination questions.

In meteorology 110 students were divided into ITV and face-to-face groups. All students took four examinations. Pearson r's (odd-even items) adjusted by the Spearman-Brown formula for two of the examinations were .80 and .73.

Analyses of covariance, controlling on partial SCAT scores, and t-tests indicated no significant differences between scores of face-to-face and ITV students on any of the four examinations.

The 188 students in psychology were divided into ITV and face-to-face groups. No textbook was used, and visuals were projected to the face-to-face group whenever a similar visual appeared in the ITV lecture. The same teachers taught both groups. Care was taken in constructing the examinations that they measured complex (principles) as well as factual learning.

Over four examinations there were no significant differences between direct instruction and ITV groups.

Ninety students in music appreciation were divided into face-to-face and ITV groups. All students took an information and a music appreciation pretest. Two examinations were given during the course, each having a factual and a listening section. The first factual test had an odd-even r of .74 (Spearman-Brown).

Analysis of variance and t-tests indicated no significant differences of scores between direct and ITV instruction on the first or second listening or factual tests.

Distance

Studies showed no significant differences in examination scores for directly instructed students near or far from the instructor in chemistry, or closer or farther than 12 screen widths in psychology.

Class size

Generally analysis of covariance indicated no significant differences in test scores of ITV students in small or large ITV classes. Class sizes varied from 11 to 119.

Sex

Students in a psychology of marriage class were divided into female, male, and mixed classes.

Analyses of covariance controlling on pretest scores indicated no significant differences on examination scores for any of the three groups. Students preferred mixed classes.

Magnification

Students in an education class were divided into face-to-face lecture with TV to enlarge the visuals, and ITV-only presentation groups.

The t-tests indicated no significant differences on two test scores between the two groups.

Proctors and attendance

Students in psychology of marriage were divided into no proctor, proctor but optional attendance, and proctor and required attendance groups. Absences were about the same in all three groups.

Air science students were divided into three groups: having a commissioned AFROTC staff officer, having a cadet officer, and having a member of the class chosen at random as proctor. After three weeks all students took an achievement test having two forms (K–R #20 r's=.79 and .81).

There were no significant differences in achievement scores among groups, and no significant differences in students' preferences for the proctoring system.

ITV and face-to-face follow-up

The 550 students in psychology were divided into ITV (35 minutes) plus a graduate student led discussion (15 minutes), viewing ITV plus viewing the teacher discuss with in-studio students, or no discussion (35-minute ITV portion only).

Analysis of variance indicated no significant differences on achievement scores among the three groups. Students preferred the face-to-face discussion treatment.

Talkback

The 260 economics students were divided into talkback and listening to talkback ITV sections.

The t-tests indicated no significant differences on achievement test scores between the two groups.

Students exchanged treatments halfway through the semester. An attitude survey at the end of the semester indicated students tended to like a talkback system, said the talkback system did not affect their achievement, thought it should be retained, and indicated they themselves almost never used it.

A similar experiment with 120 air science students using a 60-item objective test (K–R #20 r=.74) also resulted in no significant differences in students' achievement scores between talkback and listening-only ITV groups.

Independent study and discussion

The 120 students in the upper 40 percent of an economics class were divided into two groups. Both groups had two ITV lectures each week; one group attended a problem-solving discussion section each week, and the other group worked the problems independently. After four weeks, students took an examination having a multiple-choice and a problem-solving section.

The t-tests indicated no significant differences in the scores on the multiple-choice section, but the scores in the problem-solving discussion group were significantly higher than those in the independent study group.

The 84 volunteer meteorology students were randomly assigned to required attendance vs. required independent study groups for four weeks.

Analysis of covariance controlling on scores on the first examination indicated no significant differences on examination scores for either of the two groups, either in the face-to-face or ITV section.

Corrected workbooks

More than 200 psychology students were divided into three groups: those having no workbooks, having workbooks and being encouraged to fill them out, and having workbooks turned in and corrected weekly.

Analysis of covariance controlling on scores of the first examination indicated no significant differences on examination scores among groups. Analysis of variance, run on a special 10-item test specifically testing problems covered in the workbooks, indicated that the workbook groups had significantly higher scores than the non-workbook group, and the group having workbooks corrected weekly generally had higher scores on this specific test than the students who didn't have their workbooks corrected. Students were generally favorable toward the workbook.

Visualized ITV presentation

The 710 air science students were divided into two groups: ITV presentation by an instructor having a blackboard, and ITV presentation by an instruction team having several visuals, dramatizations, and other materials.

Analysis of covariance controlling on the previous examination scores indicated that students in the lecture-blackboard groups had significantly greater scores than students in the other group. The difference between scores of the two groups was .9 points. A similar experiment with 191 psychology students produced no significant differences.

Behavioral choice

A total of 626 chemistry students in two sections were involved in a behavioral attitude experiment in 1955–56. Students in both sections were divided into lecture-demonstration or ITV classroom groups. In addition, lecture students were divided into front, middle, or rear portions of the lecture hall. As was true of all the other experiments, all assignments were random. After 4 weeks, following the first achievement test, students switched treatments. After 8 weeks and another achievement test, both groups received chemistry in the lecture hall. After another week and a half students were given the option of remaining in their present lecture seats or moving to the ITV classrooms.

Thirty-two percent moved to the ITV classrooms. In one section, 52 percent of those seated in the back, 31 percent of those in the middle, and 13 percent of those in the front of the lecture hall moved to the ITV classrooms. In the other section the percentages were 46 percent, 33 percent, and 16 percent respectively. Those staying in the lecture room mentioned lack of color and narrow field of view of television as reasons for staying. Those moving to ITV rooms mentioned the close-up views of ITV, more comfortable rooms, and lack of distraction as reasons for moving to the TV rooms.

The 144 business law students were divided into two groups: face-to-face and ITV presentation. After the mid-semester examination (8 weeks), all students returned to the face-to-face situation. Fifty-four percent then preferred face-to-face and 42 percent preferred ITV presentation. A week later, students were given the choice of returning to ITV or remaining in the face-to-face lecture section. Fifty-three percent chose the direct instruction and 47 percent chose the ITV presentation.

The correlation between covert and overt attitudes was .46. There was no significant relationship between the score on the final examination and behavioral choice, or score on the second examination and behavioral choice.

A total of 219 political science students were taught for several weeks by ITV, and then all moved to a face-to-face instructional situation. The students were then given the choice of ITV classroom or face-to-face presentation (this time with cameras in the classroom).

Fifty-one percent indicated they preferred ITV; 46 percent preferred face-to-face presentation. However, 70 percent moved to the ITV classrooms and 27 percent (3 percent were absent) stayed in the face-to-face lecture room. The correlation between covert and overt attitudes was .33. Point biserial r between behavioral choice and prechoice examination scores was .12, between behavioral choice and final examination scores was .15, and between behavioral choice and Inventory of Beliefs scores was .06.

Three hundred psychology students received a televised lecture-blackboard presentation and 300 psychology students received an ITV presentation with visual and graphics emphasis. After the ninth week, both sections were taught directly in a large lecture hall. After the twelfth week, students took a vote.

Of the original visual-graphic ITV group, 61 percent voted for ITV. Of the lecture-blackboard ITV group, 52 percent chose ITV. The combined vote was 56 percent in favor of returning to ITV. A significantly greater proportion of students who had been in small ITV rooms than large rooms preferred ITV instruction.

A similar experiment had 175 education students who had face-to-face presentation for four weeks and then ITV presentation for three weeks. A secret ballot taken then indicated that 61 percent of the students favored continuing with ITV and 39 percent favored returning to face-to-face presentation.

Attitude over time

The researchers found from attitude surveys that students' acceptance of ITV gradually increased from 1954–57. Within a course, students' opinions tended to become more definite. There were large course-to-course variations in attitude. Students seemed less concerned about ITV *per se* in 1957 than in 1954. Students noticed over time that ITV courses seemed to have better instructors who had better organized instruction and courses.

42. CARPENTER, C. R., and others. "The development of a sound motion picture proficiency test." *Personal Psychology* 7 (1954), 509–523.

Problem: Comparative effectiveness of paper-pencil and sound motion picture tests of skill proficiency.

Sample: 316 draftees.

Subject taught: Removal of powerplant from a medium tank.

Key variables: Learning ability, aptitude, multiple-choice problems, weekly practical grades, score on paper-pencil final examination, score on film multiple-choice examination.

This study investigated the possibility of using motion picture films as a medium for testing proficiency of skills in subjects selected from the Track Vehicle Repairman Course. (Average age was 21.9 years, the standard deviation=2.2; Aptitude Area I score, ability to learn, was 85.94, S.D.=17.66; and Aptitude Area VIII score, ability to do repairs, was 91.33, S.D.=17.63.) Subjects scored below average on aptitude tests.

Subjects were rated weekly by their instructors on five graphic scales: (1) quality of work, (2) application of classroom principles, (3) manual dexterity, (4) selection, use, and care of equipment, and (5) time spent completing work. These combined scales were used as the criteria for evaluating the work of the trainees. In addition to these scores, the work of the trainees was evaluated by a written examination administered at the end of the training period.

To test the comparative effectiveness of using motion picture film examinations instead of the two conventional verbal examinations, a film test showing in motion pictures with accompanying sound track selected operation in the removal of a tank powerplant was produced. This film showed instructors in the school performing various tasks concerned with the powerplant removal. All persons seen in the film were identified with large numerals on their chests and backs and small numerals on their shirt cuffs. Four versions of a particular skill were shown on the screen with an accompanying sound track. An off-camera narrator read a question concerning the four choices and the students were asked to choose the correct versions they had seen and heard. The four versions were repeated. Ten seconds of clear film followed the repeats. The light from the clear film provided enough illumination for students to write down the correct version.

Two versions of the film test were constructed and a correlation of .92 was found. From the two versions, a final version of the film test was produced. It correlated .73 with the criterion (the combined weekly ratings) and .68 with the final written examination in the training course. The difference in the correlations was not statistically significant.

The authors observed that the criterion was probably not adequate because it was a verbal measure of performance when a behavioral measure was needed. They hypothesized that a high correlation would have been found with a behavioral type of criterion.

Conclusions.—(1) Motion picture tests yielded high reliability, (2) there was little difference between paper-pencil tests and film tests of this particular skill, (3) film tests are practical to administer, objectively scored, and make possible tests in areas of performance not amenable to paper-pencil tests, (4) there was no confirmation of the hypothesis that film tests would minimize the importance of verbal ability, and (5) situation-type tests with films indicated an ability to discriminate among students.

43. CARTER, LAMORE J., ROY B. MOSS, and MAMIE T. WILSON. *A comparative study of the effectiveness of three techniques of film utilization in teaching a selected group of educable mentally retarded children enrolled in public schools in Louisiana.* [USOE Project No. 272.] Grambling: Grambling College of Louisiana [n.d.]. (Mimeographed).

Problem: Determine the relative effectiveness of various film presentations on educable mentally retarded children.

Sample: 60 pupils in 16 Louisiana schools.

Subject taught: Health and safety.

Key variables: Learning from narrated film, film with children's voices on the sound track, silent film and viewing children encouraged to verbalize their reactions; different levels of mental retardation.

Three kinds of seven 20-minute films on health and safety were made; visual elements were the same on all films.

All pupils were given the 1937 Stanford-Binet

Intelligence Scale (S–B) and took a 40-item picture test, which required students to choose the best of four pictures illustrating specific health practices.

The 16 schools were then collected into four groups: a narration film group, children's voices film group, children encouraged to react overtly film group, and a control group. An alternate form of the picture test was then given as a posttest.

Although higher-ability retardees did better than lower ability, there were no differences among treatments when subjects were divided into higher- and lower-ability groups.

44. CASPERS, WESLEY. "An experimental evaluation of certain motion picture films in selected educational psychology classes in Kansas colleges." *Dissertation Abstracts* 16 (1956), 1105.

Problem: Evaluate the effectiveness of sound films for achievement in educational psychology courses and to determine attitudes toward them.

Sample: 216 students in educational psychology in six Kansas colleges.

Subject taught: Educational psychology.

Key variables: Number of sound films viewed; learning, and Minnesota Teacher Attitude Inventory (MTAI) scores.

Sixteen films were selected to cover four areas of educational psychology: (1) growth and development, (2) individual differences, (3) group learning, and (4) motivation and interest. Twelve classes from six Kansas colleges viewed 7 of the 16 films. Six other classes served as a control group. The 12 classes were divided into four groups, and each group received a different treatment in number and sequence of the films viewed. The number of films seen in each area differed: four films were presented in one area, three films in another, two in a third, and none in a fourth area. All subjects took an achievement test covering the content of the 16 films before and after viewing the sequence. This test was subjected to item analysis and was validated by correlating test scores with scores on the final objective test in the course.

An analysis of variance and covariance was run to determine the effect of treatments. Scores on the film series content test in each of the four areas were significantly related to the number of films shown in that subject area (up to the maximum of four films). Attitudes (as measured by the MTAI) improved significantly during the semester for all classes.

45. CASTLE, C. HILMON. "Open-circuit television in postgraduate medical education." *Journal of Medical Education* 38 (1963), 254–260.

Problem: Effectiveness of TV in reaching physicians for postgraduate education.

Sample: Open-circuit TV audience of 209 physicians per program; experimental comparison of retention with 23 physicians and 33 medical students.

Subject taught: Diabetes mellitus.

Key variables: Number of viewers, both physicians and lay personnel, response of physicians, learning, TV teaching, retention of subject matter presented.

From February to April 1960, eight half-hour medical clinics on diabetes mellitus were telecast by the College of Education over open-circuit educational television station KUED in Salt Lake City. Approximately 85 percent of the physicians in Utah are within the coverage area of the station. Nineteen percent, or 209 out of 1,100 physicians, and 68 percent, or 130 of 192 medical students, registered for the series and received syllabi. From a mail questionnaire it was determined that 365 physicians, or 55 percent, watched at least one of the eight clinics. The audience for each clinic was estimated at 209 physicians or 19 percent. Of the responding physicians, 94 percent rated the clinics favorably, 3 percent rated them unfavorably, and 3 percent did not respond. A majority of the physicians who did not view any of the clinics said they forgot or were engaged at the time of presentation; 3 percent said they would not be interested in future programs of this type. Seventy-five percent of the viewers and 68 percent of the nonviewers had viewed other medical TV clinics within the last 5 months.

The author states that medical clinics can be used effectively to reach physicians when broadcast over open-circuit television stations. The lack of privacy for the physicians producing the program can be minimized by transmitting the programs at hours unusual for lay viewing, announcing the program only to physicians, interposing dead air periods between the station's preceding program's termination and the beginning of the medical clinic, and using educational instead of commercial TV channels. (There was an unsuccessful attempt to estimate the size of the lay audience for the clinics.)

Recall of information from the series was tested by administering a 50-item multiple-choice content test to a volunteer group in a pretest—posttest design. The test group was composed of 23 physicians and 33 medical students, who viewed an average of 6 of the 8 programs. Five of the physicians and two of the students failed to view at least two of the clinics and were dropped from the study. Of the remaining group, 18 physicians and 31 medical students were tested. A perfect score on the test was 100 percent. The subjects scored as follows:

Subjects	*Average percent*	
	Pretest	*Posttest*
Physicians	70	88
Medical students	64	85

Conclusions.—The author concludes that (1) open-circuit television can be used in postgraduate medical education without undesirable effects; (2) the advantages of this application are extensive coverage, simplicity, availability, and relatively low cost; and (3) lack of privacy and the passive role of the learners can be minimized.

This study also includes a review of the history of open-circuit television uses in postgraduate medical education and a description of the production of the clinics.

46. CHABE, ALEXANDER M. "An experiment with closed circuit television in teacher education." *Peabody Journal of Education* 40 (1962), 24–30.

Problem: Effectiveness of televising classroom (face-to-face) instruction to student teachers.

Sample: 20 college students.

Subject taught: Teacher education.

Key variables: Observing by TV, observing in classroom, skill in social studies instruction.

This study was concerned with the effectiveness of observing instruction by closed-circuit TV. In previous work student teachers learned the objectives of social studies instruction which were (1) understandings, (2) skills, attitudes, and appreciations. The observations of an actual grade 5 classroom during social studies instruction was to demonstrate how these objectives were being met.

In consultation with a social studies methods professor, the fifth-grade campus schoolteacher agreed to prepare a lesson guide to be used by two groups of observers. One group of observers provided with the lesson guide (control group) ($N=4$) sat in the classroom during the instruction period. The other group observed the class by TV (experimental group) ($N=16$). The experimental group was separated into two subgroups, one using the lesson guide prepared by the classroom teacher and the other not using the guide.

All observers were to record the manner in which the classroom situation they observed met the objectives of social studies instruction. In analyzing these reports the author concludes that (1) TV observation was almost as effective as guided classroom observation, (2) TV viewers with lesson guides were twice as effective as those without the guides, and (3) TV observation allowed student teachers to observe the same situation as the classroom observers.

47. CHAMPA, V. ANTHONY. "Television: Its effectiveness in ninth-grade science teaching." *Audio-Visual Communication Review* 6 (1958), 200–203.

Problem: Determine the effectiveness in learning from face-to-face, ITV, and film presentations.

Sample: 300 pupils from two junior high schools in Lancaster, Pa.

Subject taught: Ninth-grade science.

Key variables: Face-to-face, television, and film presentations, learning, attitudes.

Pupils were divided into three groups. One group was taught by face-to-face instruction with neither ITV nor films. The second group saw two 15-minute ITV programs each week during their regular class time. The third group saw two 15-minute films each week during their regular class time. Outside of the TV and film portions, the study program of the three groups was the same. Often the same films shown on the TV program were used in the film group. Teachers taught one section in each of the three groups. Students were given the Cooperative General Science Test, retention tests, and attitude toward science tests for pre- and posttests. A mental age measure and ages were also available.

Analysis of variance indicated no significant differences in achievement scores among the three groups, although the boys in each group had higher scores than the girls in that group.

Pupils were quite favorable to using ITV and films.

A greater proportion of all pupils in the experiment continued their study of science a year after the experiment than the previous year's students.

48. **Clevenger, Theodore, Jr.**, and **Martin T. Cobin.** "An experiment in open circuit television instruction in the basic course in oral interpretation." *Speech Monographs* 26 (1959), 149–154.

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: 115 college students (University of Illinois).

Subject taught: Oral interpretation.

Key variables: TV teaching, face-to-face teaching, achievement test, evaluation of reading ability of prose and poetry.

Three sections of the basic course in oral interpretation were taught by open-circuit TV. Four sections of the same course were taught by face-to-face instruction. Graduate student assistants supervised classroom meetings while one professor taught the TV sections, and two professors taught the face-to-face sections. Television sections rotated between the TV studio where they served as a participating class and the receiving classrooms.

Achievement was measured by scores on a common general-content test of 74 true-false items which had been pretested and determined to be representative of the material that should have been covered in the course. This test was administered to all sections as a pretest at the beginning of the semester and as a posttest at the end of the semester. Reading ability was determined by jury evaluation of tape recordings made by each student at the beginning and end of the semester. Points were assigned to each reading and the judges did not know whether they were hearing a pretest or a posttest. Scores were obtained by summing the ratings and subtracting posttest from pretest.

Results.—There was no significant difference between the TV taught and face-to-face taught sections for poetry and prose reading improvement ratings. There was no significant difference between the TV and face-to-face taught sections in content gains from pretest to posttest.

Conclusion.—It is possible to conduct a course in oral interpretation via open-circuit TV using graduate assistant instructors which is equally effective as face-to-face teaching by experienced faculty members.

49. **Cobin, Martin T.**, and **Theodore Clevenger, Jr.** "Television instruction, course content, and teaching experience level: an experimental study in the basic course in oral interpretation." *Speech Monographs* 28 (1961), 16–20.

Problem: Comparative effectiveness of TV and face-to-face instruction with variation in experience of classroom instructors.

Sample: 287 students at University of Illinois.

Subject taught: Oral interpretation.

Key variables: TV teaching, face-to-face teaching, experience of instructors, scores on final examination.

Three sections of the beginning course in oral interpretation were taught by an experienced faculty member using open-circuit TV for lectures with supplemental classroom instruction by graduate assistants having no prior teaching experience; 11 sections were taught face-to-face by graduate assistant instructors with varying levels of prior teaching experience.

Comparisons for retention of specific course content, made at the end of a semester, were based on scores of 100-item objective final examination. The 11 control sections were divided into four groups: 3 were taught by graduate assistants who also taught supplementary sessions for the TV lectures; 2 by graduate assistants with little prior experience; 3 by graduate assistants with considerable prior graduate-assistant level teaching experience; and 3 by graduate students with full-time teaching experience.

Results.—(1) Median score for TV-taught group was significantly higher than median of group taught face-to-face by least experienced instructor. (2) Median score of TV group was higher, but not significantly higher, than the median of group taught face-to-face by inexperienced instructors who also served as supplemental instructors of TV classes. (3) Median score of TV classes was significantly higher than the median score of the combined classes taught face-to-face by the inexperienced and moderately experienced graduate assistant instructors. (4) Median score of TV group was higher, but not significantly higher, than median score of all face-to-face taught groups.

Conclusions.—Prior teaching experience does affect effectiveness in teaching subject matter with a direct relationship between the two. An experienced full-time teacher can combine TV with inexperienced graduate assistant supervision into a course which is more effective, for subject matter, than a course taught face-to-face by inexperienced graduate student assistant instructors.

50. COBIN, MARTIN T., and CHARLES J. MCINTYRE. *The development and application of a new method to test the relative effectiveness of specific visual production techniques for instructional television.* USOE Project No. 448. Urbana: University of Illinois, September 1961.

Problem: To develop a method to evaluate the effectiveness of specific production techniques.

Sample: 310 speech students at the University of Illinois.

Key variables: Form of the visual, camera number, video dimension, note-taking, and eye contact.

A television system was arranged so that the output of one camera could go to one classroom while the output of another could go to another classroom, or that a classroom could receive both outputs, or that all classrooms could receive the same output.

Students took short tests of learning and attitudes. These were analyzed by analysis of variance, *t*-tests, and chi square.

Students' responses differed when they were taking notes or not taking notes, and students preferred simple production techniques, such as continuing closeups, rather than a variety of shots.

51. COLEMAN, WADE H., JR., EUGENE DUTTON, and JONATHAN C. BOOKOUT. *Learning Aural-Oral Spanish Skills by Television.* University: University of Alabama, December 1960.

Problem: Determine the relative development of aural-oral Spanish skills in ITV and face-to-face students.

Sample: 72 high school and college students.

Subject taught: Spanish.

Key variables: Qualified and nonqualified teachers, race, achievement; ITV and face-to-face instruction.

Students were randomly selected from schools having qualified or nonqualified Spanish teachers, and who were receiving Spanish chiefly by ITV or by face-to-face instruction. Students were interviewed. Evaluators listening to the taped interviews rated each student on (1) pronunciation, and (2) comprehension, vocabulary, and grammar. Interrater correlations for pronunciation test scores ranged from .67 to .76, and interrater correlations for comprehension, vocabulary, and grammar test scores ranged from .53 to .71. No written work was included.

The ITV group having qualified teachers performed significantly better than the ITV group with nonqualified teachers, and better than the face-to-face group with qualified teachers (.05 level). There were no significant differences between the ITV group without qualified teachers and the face-to-face groups.

52. COMMONWEALTH OFFICE OF EDUCATION. "The effective use of sound films." Research Report No. 4. Sydney, Australia: The Office of Education, May 1950. *Audio-*

Visual Communication Review 2 (1954), 78–79. (Abstract).

Problem: Determine the effectiveness of various ways of presenting a film.

Sample: Boys in six junior technical schools in Sydney.

Key variables: (1) 10-minute introduction film, followed by a test; (2) introduction, film, 10-minute discussion, and test; (3) introduction, film, film again immediately, and test; (4) introduction, film, discussion, film again after 24 hours, test; (5) introduction, film, class notified about a discussion the next day, discussion the next day, film again, test; (6) introduction, film, discussion, and 24 hours later the film again, discussion, and test; learning, retention, and ability level.

All classes took 20-item pretests a month before the first film, and a retention test 18–21 days after the last film. One investigator conducted all discussions. There were six films; all classes received all six treatments using one different film for each treatment.

The most effective method was (4). Its effectiveness was not due merely to the greater time it took. Methods (5) and (6) were about equal, and were more effective than (1) through (3). Method (1) was least effective.

Bright boys learned more than dull boys. Boys who attended entertainment films more frequently learned more.

53. CRAIG, GORDON Q. "A comparison between sound and silent films in teaching." *British Journal of Educational Psychology* 26 (1956), 202–206.

Problem: Comparative effectiveness of sound and silent instructional films.

Sample: 260 students ages 9 through 15.

Subject taught: See below.

Key variables: Learning, sound films, silent films.

Two groups of students, matched on Common Entrance Examination scores, were taught six subjects by seeing six films. One group of 124 students saw the films, heard their sound tracks, and was given tests over film contents. The other group of 136 students saw the same films, took the same tests, but did not hear the sound tracks but rather heard a commentary about the film ad libbed by their teacher. The films were: (1) *Making Glass for Houses*, (2) *A Rock Pool for Schools*, (3) *Light—First Principles*, (4) *Common Cross Spider*, (5) *How Television Works*, and (6) *Ants*. One month after viewing the films, the students were given the same tests to measure retention.

Results.—Scores and standard deviations for the students and the methods of instruction were:

Test	Silent Film			Sound Film		
	N	Mean	Standard deviation	N	Mean	Standard deviation
Posttest	752	15.86	3.11	746	12.76	3.44
Delayed posttest	706	13.19	3.28	691	11.92	3.33

Conclusions.—The silent version was found to be superior to the sound version of the films. The author felt this was due to ability of face-to-face teacher to relate film content to class activities and to adapt the film to immediate purposes in the classroom.

54. CURRY, ROBERT P. *Report of three experiments in the use of television in instruction.* Cincinnati: Cincinnati Public Schools, July 1959. (Offset).

Problem: Determine the relative effectiveness of face-to-face and ITV presentations on learning, and to determine pupils' and teachers' attitudes toward ITV.

Sample: 744 mathematics pupils and 818 science pupils.

Subjects taught: Biology, seventh-grade mathematics, and sixth-grade science.

Key variables: Learning and attitudes; face-to-face and ITV presentation.

Achievement

Seventh-grade mathematics. — Three classes were chosen from each of nine Cincinnati schools. One class viewed 20-minute ITV mathematics lessons daily and had some face-to-face mathematics instruction; another class, taught by the same teacher, had face-to-face mathematics instruction exclusively, and a third class, taught by a different teacher, also had face-to-face instruction only. Three schools each having the highest student IQ mean, the middle mean, and the lowest mean were termed the above average, average, and below average ability schools respectively. IQ scores were from the Lorge-Thorndike. The STEP Mathematics level 3A test served as the final criterion measure of achievement.

Adjusted means of above-average and average-ability pupils in either control group were significantly higher than above average and average pupils in the experimental (ITV) group (.05 level). There were no significant differences between adjusted means among any of the groups for below-average pupils or between either of the control groups for any ability level. It was concluded that the level of ITV instruction was not directed toward the above-average ability pupil.[1]

Sixth-Grade Science.—Two sixth-grade classes from each of 15 schools were selected. Five schools were termed above average, five average and five below average, on the basis of student IQ mean. Within each school, classes were randomly assigned to ITV and face-to-face treatments. Within each school, the same teacher taught both classes. Lorge-Thorndike scores served as the basis for adjusting final criterion scores, and the STEP Science test level 4A served as the final achievement measure. The ITV lessons were 30 minutes long and were shown every other school day.

Adjusted means of average and below-average pupils in the ITV groups were significantly lower than were means of similar ability pupils in face-to-face groups (.05 level). There were no significant differences between adjusted means of pupils of above average ability in ITV or face-to-face groups.[2]

Attitude

Teachers' responses to a 19-item questionnaire (a hypothetical conversation in which subjects agreed or disagreed with the remarks) indicated that they felt ITV could be equally effective as face-to-face instruction, although they were not sure whether they would want to have another television class, or whether they had received the same satisfaction from teaching a class that was receiving ITV programs. Nevertheless, they did not feel that ITV would threaten their jobs. They tended to feel that students learned as much by ITV as by face-to-face methods, and that the quality of ITV was high.

Pupils' responses to a similar 16-item questionnaire indicated that sixth-grade pupils preferred ITV most, seventh-grade pupils next most, and ninth-grade biology pupils least. This trend could be due to the class or to age level. Below-average ability pupils preferred ITV most, average next most, and high-ability pupils least. Pupils were disappointed at not being able to ask questions, but seemed to prefer the uninterrupted characteristic of the ITV lesson.[3]

References

[1] Jacobs, James N., and Joan K. Bollenbacher. "Teaching ninth-grade biology by television." *Audio-Visual Communication Review* 8 (1960), 176–191.

[2] Jacobs, James N., and John H. Grate. "Teaching sixth-grade science by television." *Elementary School Journal* 63 (November 1962), 96–103.

[3] Jacobs, James N., and Joan Bollenbacher. "Teacher and pupil opinions of instructional television." *The NASSP Bulletin* 44 (March 1960), 71–78.

55. CURRY, ROBERT P. *Report of four experiments in the use of television in instruction.* Cincinnati: Cincinnati Public Schools, Sept. 1, 1960. (Offset).

Problem: Determine the relative effectiveness of face-to-face and ITV presentation, and assess students' attitudes toward ITV.

Sample: 660 fifth-grade science pupils, 263 mathematics pupils, and 251 biology pupils.

Subjects taught: Fifth-grade science, seventh-grade mathematics, and biology.

Key variables: Learning, ability, involvement, retention, and attitudes; face-to-face and ITV presentation.

Fifth-grade science.—One class in each of 15 schools had 20-minute ITV science lessons every other day plus 10 minutes of classroom discussion and follow-up. The other class in each school had face-to-face instruction. Both classes in each school were taught by the same teacher. Five schools were selected at each of three arbitrarily defined ability levels. Kuhlmann-Anderson intelligence scores defined ability levels; the criterion measure was the STEP Science form 4B.

Analysis of covariance indicated that below-average and average ITV pupils had significantly lower STEP scores (.01 level) than did face-to-face pupils of comparable ability. There were no significant differences between scores of above average ITV and face-to-face pupils.[1]

Fifth-grade science (pupil involvement).—One fifth-grade class in each of 15 schools was randomly assigned to receive ITV under conditions of high pupil involvement, while one class in 15 other schools received ITV under conditions of low pupil involvement. All pupils had received four months of fifth-grade science every other day. No teacher-initiated discussion or follow-up occurred after the telecasts during the experiment.

After four weeks, pupils took a 45-minute multiple-choice test. Pupils took a 5-item attitude questionnaire before and after the experiment.

Analysis of covariance indicated no significant differences between high- and low-involvement groups for above-average, average, or below-average ability levels.

There were no significant differences between low- and high-involvement groups on listing their favorite subjects, or whether the ITV lessons were paced right. The pre-questionnaire and low-involvement group responses were not significantly different in liking to study science by ITV, but the pre-questionnaire and high-involvement group responses were significantly more unfavorable toward ITV. Pre-experimental and low-involvement groups found it easy to pay attention to ITV lessons, but pre-experimental and high-involvement groups found it harder to pay attention. These two differences were primarily due to high-ability students. Similar results were found for liking to take science by ITV next year; pre-experimental and low-involvement groups indicated they would like it whereas pre-experimental and high-involvement groups indicated they would not like it.[2]

Grade seven mathematics.—The purpose of this particular experiment was to compare the effectiveness of ITV and face-to-face instruction with homogeneously grouped, low-ability pupils. The course was designed for pupils who were 1½ to 2½ years retarded in arithmetic achievement. Pupils were selected for the course by their grade on the Stanford Intermediate Arithmetic Achievement Test. Principals of three schools randomly assigned pupils in their schools to four sections, two of which received face-to-face instruction and two of which received ITV lessons. Each teacher taught a television and a face-to-face class. Telecasts were shown three days a week for 20 minutes, and were followed by 30 minutes of class discussion. Seven months later, all pupils took the Metropolitan Intermediate Arithmetic Achievement Test.

There were no significant differences on computation subtest scores on the Metropolitan exam between ITV and face-to-face pupils. For the problem-solving and concepts subtests scores a significant interaction was found between methods and teachers. The t-tests indicated that scores of ITV pupils were significantly higher (.05 level) than scores of face-to-face pupils in two of five comparisons.[3]

Biology.—A follow-up retention study was made of an earlier experiment. A total of 180 pupils had received biology instruction by ITV and 180 by face-to-face instruction. The ITV classes had been 50 minutes long. Some pupils had taken additional science courses since then and some had not. Pupils were given an alternate form of the Cooperative Biology test that they had taken two years earlier.

Analysis of covariance indicated no significant differences in retention scores between ITV or face-to-face pupils, for any of three levels of science courses taken since biology. When above-average ability classes alone were considered, and posttest scores were adjusted for pretest scores, posttest scores of ITV classes were significantly higher than scores of face-to-face pupils (.05 level). However, for the same group, when retention test scores were adjusted for either pretest or posttest scores, there were no significant differences between ITV or face-to-face pupils.

References

[1] Jacobs, James N., John H. Grate, and Ullainee M. Downing. "Do methods make a difference in educational television?" *Elementary School Journal* 63 (February 1963), 248–254.

[2] Jacobs, James N., Joan Bollenbacher, and Mildred Keiffer. "Teaching seventh-grade mathematics by television to homogeneously grouped below-average pupils." *Mathematics Teacher* 54 (1961), 551–555.

[3] Jacobs, James N., and Joan Bollenbacher. "Retention of subject matter in televised biology." *Audio-Visual Communication Review* 8 (1960), 275–280.

56. CURRY, ROBERT P. *Five years of research in television instruction in the Cincinnati public schools, 1955–56 through 1959-60: Summary and generalizations.* Cincinnati: Cincinnati Public Schools, September 1960. (Offset).

See other abstracts of authors. This summarizes some experiments in the other abstracts and briefly outlines a few earlier experiments, such as televising a driver's education course and a 12th-grade chemistry course.

57. DAVIES, VERNON, EDWARD GROSS, and JAMES F. SHORT, JR. *Experiments in teaching effectiveness applied to introductory sociology.* Pullman: Washington State University, Aug. 1, 1958. (Offset).

Problem: Determine students' achievement and attitudes toward the teacher and course.

Sample: 60 students.

Subject taught: Introductory sociology.

Key variables: Lecture, lecture with visual aids, ITV; attitudes, achievement, and teacher.

Students were assigned to one of three groups. Each group received a 4-week presentation by lecture, lecture with visual aids, and ITV. Three teachers were also rotated among the three groups.

Analysis of covariance on achievement scores indicated no significant differences among the three methods of instruction.

For teacher A, 25 out of a possible 111 comparisons of students' reactions to the three teaching methods were significant (.05 level), of which 23 favored the lecture method over the lecture with visual aids and over ITV. There were also few significant differences between students' attitude scores toward visual aids and toward ITV.

Students' scores on 15 of the 37 items on the objective attitude instrument rated instructor B significantly higher (.05 level) on his ITV teaching than on his lecturing with visual aids. On two items he was rated significantly higher on his ITV teaching than on his lecturing. On 12 items he was rated higher on his lecturing than on his lecturing with visual aids.

Students' scores on 16 items for instructor C rated him significantly more favorable on his visual aids presentation, on 4 items rated him significantly more favorable on his ITV presentation, and on 2 items rated him significantly more favorable on his lecturing.

58. DE PROSPO, NICHOLAS D. "Developing scientific attitudes by responding actively to motion pictures: a study to determine if responding actively to selected motion pictures by identifying the problem-solving skills they portray reinforces or develops a scientific attitude in college freshmen." *Dissertation Abstracts* 18 (1958), 521.

Problem: Determine if responding actively to motion pictures develops a scientific attitude.

Sample: 240 college students.

Subjects taught: Madame Curie, Yellow Jack, and the Scientific Method.

Key variables: Motivated film group, film group, non-film group; attitudes, and attitudes over time.

Students were randomly assigned to one of the three groups, motivated film, film, or control. Students in the motivated film group understood the purpose of the experiment, identified the problem-solving skills as they were portrayed, and answered specific questions after viewing the films. All groups took a Thurstone-type scale of suspended judgment ($r=.88$) before and after the treatment, and again 6 weeks later.

Differences in attitude scores of the motivated film and film group were not significant; both groups had greater attitude change than the control group. Attitude change was not related to scholastic ability, or to ability to identify the skills, and was negatively correlated to the opinion of the scientists portrayed. The contribution of the films was not as great to retention as to the gain in attitude.

59. DEVAULT, M. VERE, W. ROBERT HOUSTON, and CLAUDE C. BOYD. *Television and consultant services as methods of in-service education for elementary school-teachers of mathematics.* USOE Project No. 419. Austin: The University of Texas, 1962. (Mimeographed).

Problem: Determine the relative effectiveness of television, television plus classroom consultant services, face-to-face lecture-discussion, and face-to-face lecture-discussion plus classroom consultant services.

Sample: 87 elementary teachers of grades 4–6 of Dallas Independent School District.

Subject taught: Teacher training in mathematics.

Key variables: Television and face-to-face presentation; classroom consultant services; teacher and pupil achievement, teacher attitude.

One-half of the teachers saw 24 half-hour weekly videotaped lessons on mathematics instruction, and half took 12 lecture-discussions of 90 minutes each (also presented by the TV teacher). One-half of the teachers comprising each group had consultant services (averaging five visits a teacher) in addition to the television lesson or lecture-discussion. A special instrument was constructed to measure teachers' achievement on phases of mathematics stressed in the experiment. The STEP Mathematics Level 2 and another test measured application and teacher achievement in the program. Also teachers' reactions were obtained.

Application of t-tests to instrument scores indicated no significant differences between television and face-to-face lecture-discussion groups in changing teachers' attitudes toward the in-service program, or in changing teachers' understanding of mathematics and methods, or in changing mathematics achievement and interest of pupils. Consulting services resulted in significantly more favorable reactions from ITV teachers and in greater mathematics achievement of their pupils. A parallel finding was not found for consulting services for the face-to-face teachers.

60. DEVINEY, ROBERT DAWSON. "An evaluation of closed-circuit television observation for students taking certain courses in elementary education." *Dissertation Abstracts* 23 (1963), 3198–3199.

Problem: Determine if differences in achievement and attitudes toward pupil-teacher relations were a function of television observations.

Sample: 719 students in an elementary education course.

Subject taught: Elementary education observation.

Key variables: Television presentation, learning, attitude.

Instruments used included two to measure achievement, one for problem solving, and the Minnesota Teacher Attitude Inventory (MTAI). All were administered as pre- and posttests. The same instructor taught both experimental and control groups.

No differences were found between mean difference scores on either of the content tests, on the scores of the problem-solving test, or on the mean difference scores on attitudes toward pupil-teacher relations. This was true for both fall and winter semesters. Attitude test scores did not differ significantly between students who had had no television observations and television students. Of the students 70 percent indicated they

2

would voluntarily register for another ITV course.

61. DEVITT, JOSEPH J. *Intellectual stimulation of gifted pupils in small secondary schools through televised instruction.* USOE Project No. 032. Augusta, Maine: State Department of Education [n.d.].

Problem: Determine the relative effectiveness of ITV courses to stimulate gifted children in grades 10–12 of rural schools.

Sample: 600 students in over 200 public and private schools who had an IQ score of 120 or higher and who had superior reading ability.

Subjects taught: Mathematics and science.

Key variables: Learning, ITV-only presentations, monthly seminars, biweekly visits, and both seminars and visits.

Students in each mathematics and science course had 30-minute ITV lectures five days a week throughout the year. Students took the Sequential Tests of Educational Progress (STEP) in math and science, one of the School and College Ability Tests (SCAT), the Facts about Science test, and a Sizing Up Your School Subjects questionnaire, before and after each school year. Students also took a 36-item attitude questionnaire and a 39-item multiple-choice biographical aspiration inventory at the end of the year.

Students were divided into four groups. One group had ITV plus their school's resources. A second group had in addition monthly seminars. A third group had biweekly visits from teachers, and a fourth group had both seminars and visits.

Analysis of covariance indicated that Mathematics I students' scores on staff-constructed achievement tests tended to be highest in the seminar and visits groups, and lowest in the ITV-only group. Analysis of variance indicated that Mathematics II seminars and visits students' scores on the staff-constructed achievement tests tended to be about the same as ITV-only students' scores, but the other two groups had significantly higher scores.

There were no significant differences among students' scores in either of the two science classes. There were no significant differences among students' scores in any of the four classes on STEP math or science scores.

In only one class, Mathematics I, was there a significant F ratio among groups on Sizing Up Your School Subjects scores.

Students tended to be more favorable toward face-to-face than ITV courses, and more favorable toward mathematics than science courses.

62. DIAMOND, ROBERT MACH. "The effect of closed circuit resource television upon achievement in the laboratory phase of a functional anatomy course: A comparative investigation of television as a magnification device during laboratory demonstrations." *Dissertation Abstracts* 23 (1962), 884.

Problem: Compare the achievement of face-to-face laboratory and television demonstration methods.

Sample: 107 college students.

Subject taught: Functional human anatomy.

Key variables: Face-to-face and television demonstrations; ability; learning.

An analysis of variance was run on the scores of the experimental and control groups on four achievement tests. It indicated no significant differences between groups initially.

Control and experimental groups were subdivided by ability levels. The t-tests, used to test for significance of differences between common ability levels of the control and experimental groups, showed that low-ability students in the experimental group had significantly higher scores than low-ability students in the control group on one test.

Since no differences were found generally, it was concluded that television's main advantage for laboratory demonstration was in the saving of the instructor's time.

63. DIETMEIER, HOMER JUSTIN. "The effect of the integration of science teaching by television on the development of scientific reasoning in the fifth-grade student." *Dissertation Abstracts* 22 (1962), 3517–3518. (Compare studies by Gerard T. Amirian, Mary Elizabeth Kraft, and A. Cornelia Sheehan.)

Problem: Determine the effect of certain variables on science reasoning.

Sample: 90 fifth-grade classes in thirty towns around Boston.

Subject taught: Fifth-grade natural science.

Key variables: Teacher training, study guide utilization, class participation, individual projects, student ability and television presentation; learning and reasoning.

All pupils took one nationally standardized test and three specially constructed instruments which the author describes as science reasoning instruments. On the first instrument the pupils had to indicate which of a group of five formed a group of four because of a characteristic the fifth did not have. On the second instrument the pupils had to analyze visual images to find common characteristics. On the third instrument the pupils had to solve problems by deductive and inductive reasoning from certain statements of fact. All instruments were administered before and after the television series. Of the 90 classes, 18 served as a control group, 24 classes had teachers trained in the utilization of television, 24 had teachers trained in elementary science, and 24 of the class teachers had no special training. Half of the 72 classes comprising the experimental group used the television series to begin the unit each day and half used the series to end the unit each day. Half the teachers received study guides and half did not. Half of the classes worked on common class assignments, and half worked on individual projects.

Class mean differences between pre- and posttests rather than individual differences were used in analysis. Analysis of variance technique showed no significant differences in science reasoning scores among any of the groups. Gain scores on a scientific information test were significantly higher for the experimental group.

The author mentions that scores on the reasoning instruments may be related to maturation, and that some information may well have been lost by the practice of using mean scores rather than individual scores. Gains on the scientific information test were not accompanied by parallel gains on the reasoning instruments. The author suggests two explanations: that the teaching techniques used were more appropriate for teaching science information than for developing science reasoning ability, or that science reasoning is related to maturation.

64. DOWELL, ERNEST C. "An experiment in training by television." Project 53–32. Training Analysis and Development, 3380th Technical Training Group, Keesler AFB, February, 1954. *Audio-Visual Communication Review* 4 (1956), 249. (Abstract).

Problem: Compare television and face-to-face methods.

Sample: 127 trainees.

Subject taught: Electronics.

Key variables: Face-to-face and ITV; learning.

Three lessons were prepared; the same instructors taught ITV and face-to-face groups. It was concluded that the presentation methods were equally effective.

65. DREHER, ROBERT E., and WALCOTT H. BEATTY. *Instructional Television Research. Project No. One: An Experimental Study of College Instruction Using Broadcast Television.* San Francisco: San Francisco State College, April 1958.

Problem: Determine the relative effectiveness of face-to-face and ITV presentation and students' and teachers' attitudes toward ITV.

Sample: About 35 students in each of the presentation method groups in each of the four courses.

Subjects taught: Psychology, economics, basic communication, and creative arts.

Key variables: Achievement, ability, personality, auding, attitudes; on- and off-campus ITV and face-to-face presentation.

All students took the Edwards Personal Preference Schedule (EPPS), the Auding Test, the American Council on Education Psychological Examination (ACE), or the School and College Ability Tests (SCAT), a self-insight scale, Bills-Vance-McLean Index of Adjustment and Values

(IAV), and a sociometric test. The latter three were given again at the end of the course, along with a questionnaire. Grade-point averages were also available for all students. Students in the psychology course took a subject-matter test (split-half r corrected by Spearman-Brown=.85) before and after the course. Students in the economics class also took Hill's Economic Test before and after the course. English course students took the Cooperative English Test (Reading Comprehension) before and after the course. Creative arts students took a specially constructed achievement test as a posttest (r=.81).

Students were in one of three sections. The face-to-face section had 3 hours a week with the same professor who taught the ITV course and who made normal classroom use of audiovisual materials. Students in this section had schedules which prohibited them from seeing ITV broadcasts. The ITV on-campus group viewed two 45-minute ITV classes a week and had biweekly two-hour discussion periods with a professor other than the ITV teacher. The ITV presentation made use of special visualization materials. The ITV off-campus group watched the same ITV classes and had biweekly two-hour discussion periods with the ITV professor.

Analyses of variance run on EPPS scores for each of the four courses for the three different presentation methods indicated no significant differences in EPPS profiles among any of the four courses.

Analyses of variance run on high school GPA, SCAT scores, age, Auding Test scores, self-insight test scores, and subject-matter test scores indicated no significant differences among any of the three presentation groups in the psychology course. Similar findings were found for students in economics, English, and creative arts. It was therefore concluded that the groups did not initially differ significantly on any of these measures or on EPPS scores.

Analysis of variance on posttest subject-matter scores for psychology, economics, and English students in the three presentation methods groups indicated no significant differences among presentation methods. Chi square indicated no significant differences in the frequencies of grades assigned to each of the groups in each of the courses for any of the presentation methods. The t-tests of total course examination scores between the presentation methods within each course indicated no significant differences between presentation methods, except that in creative arts, on-campus ITV students had higher total course examination scores than face-to-face students (.05 level).

Analysis of variance run on posttest self-insight scores among presentation methods for each of the courses indicated no significant differences. The t-tests on self-insight gain scores for each presentation method for each course indicated that students in psychology, English and creative arts made significant self-insight gains (.01, .01 and .05 levels respectively), but economics students made no significant self-insight gains.

A chi-square test was made of IAV scores that moved more than one SE_m toward or away from the mean (norm), for students in all four courses. In only one group (psychology face-to-face students) was the movement significant. Chi-square tests were also run on differences in pretest scores and on differences in posttest scores above and below the IAV means for all presentation method groups for all courses. No significant values resulted.

The top and bottom 27 percent (as determined by grade-point averages) of each psychology and economics group were selected, and t-tests were run among the presentation method groups in each course. Face-to-face psychology students in the upper 27 percent (GPA) had significantly lower gain scores than either of the ITV groups. Similar, though nonsignificant, trends existed for students in the economics course. The t-tests of subject-matter gain scores of students in the lower 27 percent in psychology and economics indicated that these face-to-face psychology students had significantly lower gains than the on-campus ITV students (.05 level). The t-tests generally indicated no significant differences among presentation methods for any of the four courses for students with either high or low grade-point averages. Students with high ACE or SCAT scores in the ITV groups tended to gain significantly more than those in face-to-face groups. Students with low ACE or SCAT scores tended to gain about the same regardless of presentation method. Auding ability and scores on the need-achievement scale of the EPPS were not related to presentation method.

Sociometric techniques indicated that students tended to know each other more in face-to-face classes than in ITV classes. Off-campus ITV students tended to be favorable toward ITV, and on-campus ITV students tended not to be favorable toward ITV. Generally, students in the on-campus ITV groups were most critical of their course, and face-to-face students were least critical.

Professors generally were less than enthusiastic toward ITV. They frequently mentioned the lack of student contact as a reason for this attitude. Teachers did not approve of discussion sections meeting only every two weeks.

66. DRISCOLL, JOHN P. "Can TV improve college teaching?" *NAEB Journal* 18 (March 1959), 16, 20.

Problem: Comparative effectiveness of visualized TV and face-to-face instruction.

Sample: 293 students.

Subject taught: Introduction to education.

Key variables: TV teaching, face-to-face teaching, attitude change, experimental class size.

A control group of 146 students, composed of five separate classes, was taught by nonvisualized face-to-face instruction. The experimental group with 147 students was divided at random into two viewing rooms seating 24 and 123 students. Because of a slight difference in grade-point average between groups, analysis of covariance was used to evaluate data.

The experimental groups were taught twice a week by illustrated lectures broadcast over closed-circuit TV with camera and receivers in the room occupied by instructor and students. Students in the large experimental group were able to watch both the instructor and the TV screens. The small experimental group was given the same material two days per week. Both experimental groups met together one additional day per week for viewing motion picture presentations.

All groups were given a pretest and posttest on material covered in the course. Actual learning was measured by the objective final examination. Attitude change was measured by a pretest and posttest administration of the Minnesota Teacher Attitude Inventory (MTAI) and by a forced preference scale measuring attitude toward teaching as a profession.

Results.—There was no significant difference between groups on the final examination, but the TV-taught groups had a slightly higher score. There was no significant difference between groups on the course content test gains from pretest to posttest, but scores favored the face-to-face group. All groups learned significantly from the course presentations. A significant gain from pretest to posttest on the MTAI was noted for the TV-taught group (.001 level), compared to the gain for the face-to-face taught group. There was no significant difference in test performance for the large and small TV-taught classes. Students favored film learning over televised chart learning because chart presentations obligated and encouraged note-taking which students felt was useful but tedious. Students favored the foundational concepts portion of the course over the administrative and organizational concepts portion.

67. DRISCOLL, JOHN P. *The effects of mental retardation on film learning.* USOE Project No. 365. Los Angeles: University of California, [n.d.]. See also article by author in *Research Bulletin of the Audio-visual Association of California* 2 (1960).

Problem: Determine the relative effectiveness of various types of films on learning of mentally retarded children.

Sample: 402 students in 21 junior (mean mental ability (MA) = 68) and senior (mean MA = 69) Los Angeles County schools.

Subjects taught: *Help Wanted* (28-minute black-and-white story film), *Our Economy*, and *Government* (8-minute animated color film).

Key variables: Learning factual and complex material, oral and visual tests, ability, and attitudes; film length, color and black and white.

Students were tested orally before and after the *Help Wanted* and *Our Economy* films, and after the *Government* film. Most responses were scored as "understands," "partially understands," or "does not understand."

Chi squares on before and after responses to questions showed a significant increase in factual learning from the *Help Wanted* film and a significant increase in complex learning from the *Our Economy* film. Students learned significantly more upon repeated screenings of this film. A posttest on the *Government* film was given by showing pictures from the film. Chi squares on before and after responses to five attitude questions for the *Help Wanted* and *Government* films also showed significant (.001 level) shifts to greater favorability from pre- to posttest.

There was no significant correlation between intelligence scores (above or below 68) and learning scores on the *Government* film.

68. **Driscoll, John P.** *The effects of mental retardation on film learning: a study to determine what type of instructional film experiences are meaningful to children with mental retardation regularly enrolled in public schools.* Los Angeles: University of California, [n.d.]. (Mimeographed).

Problem: Determine the effect of mental retardation on learning from film.

Sample: 402 junior and senior high school students in classes for the retarded in Los Angeles.

Subjects taught: Getting a job, economy, civics.

Key variables: Story, expository, and animation films; learning, film repetition, film length.

Three films were prepared: a 28-minute story film about getting a job, a 7-minute expository film on economy, and a colored, animated 10-minute film about civics. Differences in pre- and posttest scores on the learning instruments for both the 28-minute story film and the 7-minute expository film were significant; students learned from these films. Scores of students who saw the same film twice were significantly greater than scores of those seeing the film only once.

It was concluded that story films can teach behavior and emotionally involve students with the film. Short films or color films were not required for retarded students provided they became emotionally involved. It was possible to teach with films 30 minutes long. Humor was not as significant as story-line to the retarded. Retarded students—except those of quite low ability—generalized readily from ideas presented by film.

69. **Duke, Ben Calvin, Jr.** "An analysis of the learning effects of differential treatment upon above- and below-average college students enrolled in a closed-circuit television course." *Dissertation Abstracts* 20 (1960), 3221–3222.

Problem: Determine the relative effects on learning of homogeneous grouping, independent study, and advanced readings on above-average college students and the effects of homogeneous grouping on below-average students in an ITV course.

Sample: 321 students.

Subject taught: Economics.

Key variables: Homogeneous grouping, independent study, advanced reading, and high- and low-ability level.

All students watched 30-minute television lessons and had 20-minute discussion periods following. After the first course exam, students were divided into high- and low-grade groups. The upper 40 percent ($N=128$) were randomly assigned to one of four groups: continued viewing with the others of the class, assignment to a special viewing room (high-ability homogeneous group), assigned to a special viewing room and having additional advanced readings, and excused from class attendance. Students falling in the lower 20 percent of the distribution on the first test ($N=64$) were all randomly assigned to viewing rooms along with the middle-range students except for one special section (low-ability homogeneous group). Proctors were rotated every 4 weeks.

Analysis of covariance controlling on the first exam scores and using the sum of the scores on succeeding tests indicated no significant differences among the above- and below-average groups on all tests.

70. **Dunham, Morton D.** "An experimental study of the effect of two discussion techniques on educational outcomes in a beginning educational psychology class

taught by closed-circuit television." *Dissertation Abstracts* 21 (1960), 122–123.

Problem: Determine whether the absence of maximum feedback would result in significant differences between television and face-to-face discussion techniques.

Sample: 167 undergraduates.

Subject taught: Educational psychology.

Key variables: Ability, preference for instruction method, sex, discussion technique, TV presentation, achievement, MTAI scores, and misconceptions about education scores.

Students were randomly assigned to television or non-television discussion sections. Each of the four variables (ability level, preference for instruction method, sex, discussion technique) was divided into two levels for both television and non-television discussion groups. Achievement was measured by a pre- and posttest for content, and attitude toward teaching by the MTAI. Also a test of misconceptions about education and a course evaluation scale were used. All students saw 50-minute televised lectures before the discussion periods began.

No significant differences were found in achievement scores or misconceptions about education scores between the face-to-face or television discussion methods. In the face-to-face discussion situations, students with a cognitive preference for instruction had significantly greater attitude change toward teaching (MTAI scores) than students with an affective preference for instruction. In the television groups, no significant differences were found between students of cognitive and affective preference for instruction, although the television situation was significantly less effective in attitude change than the face-to-face situation for students with a cognitive preference. Students in the face-to-face group produced significantly more favorable opinions of the course, and fewer criticisms of the course, than students in the television group.

71. **Duval, D. P., and others.** The effectiveness, acceptability, and feasibility of technical training courses recorded on sound motion pictures and slides plus tape. NAVTRADEVCEN Technical Report 364–1. Port Washington, Long Island, New York: U.S. Naval Special Devices Center, June 1960. *Audio-Visual Communication Review* 8 (1960), 312. (Abstract).

Problem: Determine the effectiveness of film and slides plus tape with face-to-face instruction.

Sample: Trainees.

Subjects taught: The constant runout control valve, and the mirror deck landing sight.

Key variables: Film and slides, and face-to-face presentation; learning, and attitudes.

The first course was 4 half-hours long and the second was 21 half-hours long.

The recorded instructor, judged by trainees' course grades, was as effective as the face-to-face presentation.

72. **Dyer-Bennet, John, William R. Fuller, Warren F. Seibert, and Merril E. Shanks.** "Teaching calculus by closed circuit television." *American Mathematical Monthly* 63 (July 1958), 430–439.

Problem: Comparative effectiveness of face-to-face and televised instruction, attitudes of students toward televised instruction.

Sample: 194 college students.

Subject taught: Calculus.

Key variables: Learning change for students in ability-ranked groups. Pretest-posttest attitude toward instructional TV survey.

Students were put in two groups. The control group was taught by face-to-face instruction for three periods per week with 90 students and a fourth meeting per week with about 23 students with a graduate assistant. The experimental group was taught by television with four sections of 25 students each for three hours a week. A fourth meeting each week was taught by a graduate student assistant in a face-to-face situation. Two professorial members of the Department of Mathematics taught both sections face-to-face, the TV teachers exchanging roles half way through the semester. There was no significant difference in the pretest scores of the experimental and control groups on the Purdue Mathematics Training Test.

Two types of criteria were used in the study. Student achievement was measured by six tests administered during the semester. Attitudes were measured by a 10-item questionnaire administered to all students before and after the semester's instruction.

Results

From the population of the groups, 61 matched pairs of students were drawn. Each of the 61 experimental group students was matched on the basis of grade point average (GPA) with a student in the control group. Correlation between GPA and summed scores on the six achievement tests was .65 for the experimental group and .55 for the control group. Of the six tests, four had no significant difference between experimental groups and control groups; two significantly favored the control group (with levels of significance beyond .01 and .05 respectively).

Student response to the 10-item pretest and posttest attitude inventory showed that students in the experimental group (TV) did alter their feelings unfavorably toward TV as a means of instruction, but this was not a complete rejection. About 40 percent of the students in both groups felt TV had a place in the instruction when the semester was over; 20 students in the control group (face-to-face) did not feel that the TV classroom was as "comfortable" as the TV students felt it was.

Conclusions

1. Student achievement was nearly the same for both groups. No significant difference when scores on tests were summed.

2. No evidence of differential learning for different ability groups.

3. TV students shifted toward unfavorable opinion of TV as means of instruction after experiment.

4. Final reactions of TV students, while more negative than pretest reactions, was not strong enough to preclude acceptance of TV as means of instruction.

73. Ellery, John B. *A pilot study of the nature of aesthetic experiences associated with television and its place in education.* Detroit: Wayne State University, Jan. 15, 1959. (Mimeographed).

Problem: Determine the effect of a speech on students of various levels, and the effects of various production techniques on learning and retention.

Sample: 90 Michigan junior high school students; eight high school classes of about 20–25 students each.

Subjects taught: A speech by President Eisenhower; five short speeches on (1) speech sounds, (2) phonetics, (3) semantics, (4) public address, and (5) social aspects of speech.

Key variables: Ability level, learning, retention and production.

Experiment I

The 90 junior high school students were divided into above-average (110–125), average (95–105), and below-average (below 95) IQ groups. IQ scores were from the California Achievement Test. Each group viewed a 30-minute kinescope of a speech by President Eisenhower and recorded their approval responses by pushing a button. After 31 days the students took a written posttest of 20 questions. Because the below-average group became disorderly after 15 minutes of the speech, responses of all groups were subsequently limited to that time in analysis.

On the retention instrument, above-average students did better than average, who in turn did better than below-average students.

Experiment II

Two kinescopes of five 8-minute segments each were produced; each pair of segments was identical except for one production variable. The production variables were dollying vs. cutting, production errors vs. no production errors, a limbo set vs. a nonlimbo set, and flat lighting vs. key lighting. All high school students took a pre-, post-, and delayed (one month) subject-matter posttest.

The *t*-tests on subject-matter scores generally indicated no significant differences between the production variables for any of the three test administrations.

74. ENDERS, DONALD EARL. "Academic achievement in grade six science resulting from supplementary instruction by open circuit television." *Dissertation Abstracts* 21 (1960), 131.

Problem: Determine the achievement resulting from using supplementary television programs.

Sample: Sixth-grade Pennsylvania children.

Subject taught: Science.

Key variables: Television and face-to-face presentation; number of television lessons; learning.

One section received a weekly 15-minute science television program for 20 weeks related to the science subject being taught. Another section received only half as many television programs, and a third section served as a control group. All pupils took 109-item objective pre- and posttests, and television pupils also took a 10-item objective test at the end of each science lesson.

Both television groups made significantly greater improvement than the control group. However, the group which viewed 12 television lessons showed significantly greater improvement than the group which viewed 20 television lessons.

75. ENGELHART, MAX D., EDWARD C. SCHWACHTGEN, and MARY M. NEE. "Report on the instruction experiment in high school physics in the Chicago public schools." Chicago: Chicago Public Schools, 1957. *American Journal of Physics* 26 (September 1958), 347–349.

Problem: Determine the effectiveness of physics kinescopes with ability ranked students.

Sample: 1,598 Chicago high school students.

Subject taught: Physics.

Key variables: Kinescope and face-to-face presentation, learning by ability matched students.

Physics I was taught to 692 students by television and to 906 students by face-to-face instruction. Four experimental and control groups of 307 students each were selected from scores on the Otis intelligence test. A specially constructed physics test was administered to both groups. Test contained 140 items.

The average score for both the kinescope and face-to-face groups was 71 for one set of 307 students. Second group of 307 students had test means of 69 for kinescope instruction and 72 for face-to-face instruction. Students of IQ above 120 and students of IQ below 100 scored relatively lower with kinescope instruction than with face-to-face instruction. The conclusion is drawn that students with IQ above 120 and below 100 profit relatively more from face-to-face instruction than kinescope instruction.

76. ERICKSON, CARLTON W. H. "Teaching general science through film production." *Audio-Visual Communication Review* 4 (1956), 268–278. (See also "The effectiveness of joint pupil-teacher motion picture production as a method of teaching general science," volumes I and II. *Dissertation Abstracts* 15 (1955), 2489.)

Problem: Determine the relative effectiveness of teaching by film presentation and film production, and to determine students' attitudes toward each method.

Sample: 55 students in West Hartford, Conn. junior high schools.

Subject taught: General science.

Key variables: Film presentation and film production, learning, attitudes.

Two classes were taught general science by two different teachers. During the first half of the semester, one teacher used eight motion pictures in addition to texts and problems, while the other teacher's class produced a film instead of viewing some, but used the same texts and problems. For the second half of the semester, the teachers switched treatments.

Students producing the film received significantly lower scores on objective science information posttests than those viewing the films. There were no significant differences between groups in retention scores. Students liked the production treatment better. Generally, students thought they learned more from the viewing than production treatments.

It is probable that students in the production treatments learned more nonscience information and techniques (for example, writing skills, film production) than students in the viewing treatments.

77. ERICKSON, CLIFFORD G., and HYMEN M. CHAUSOW. *Chicago's TV College: Final Report of a Three Year Experiment.*[1] Chicago: Chicago City Junior College, August 1960.

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: 28,874 junior college students.

Subjects taught: English, social science, biology, political science, mathematics, physical science, accounting, shorthand, humanities, psychology, American literature, music, speech, astronomy, business law, languages.

Key variables: TV only, TV plus face-to-face, face-to-face instruction, student reaction.

[Note: This is a summary of the achievement comparisons in the controlled experiments only. The original study contains a complete description of the project including comparative costs of TV and face-to-face instruction, and a review of the various research techniques used.]

Achievement comparisons for first two years.—The experimental design focused on comparing the achievement of TV students at home with students in face-to-face classroom situations. In the first year comparisons were made between TV at home students and regular day classroom students. Some attention was also given to sections on the campus which were taught by a combination of TV lectures with face-to-face follow-up discussion sessions.

In the second year, comparisons were made between TV at home students and face-to-face taught evening students. These evening students were more closely matched to the TV at home students in terms of age and motivation than were the regular daytime students. Some experiments attempted to hold the teacher variable constant by having the TV teacher teach face-to-face control sections.

The results of these experiments are shown on the following pages.

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[1] For a detailed report of the first two years of this project see Erickson, Clifford G. and Hymen Chausow. *Chicago's TV College: Report of the First Year of a Three Year Project.* Chicago: Chicago City Junior College, 1958, and *Chicago's TV College: Report of the Second Year of a Three Year Project.* Chicago: Chicago City Junior College, 1959.

First-year results.—No significant differences (NSD) were noted between the TV, TV plus face-to-face, and the face-to-face groups except for the biology class. The following is a summary of results:

Class	Instruction method	Number	Criterion	Score	Analysis technique	Significance
English 101	TV-home	354	Final exam	75.41	Covariance	NSD
	TV-class	32		72.08		
	Face-to-face	101		71.13		
Social science 101	TV	90	Final and midterm	158.45	Matched pairs	NSD
	Control	90		153.33		
Biology 101	TV-home	259	Final exam	110.31	Analysis of variance	Favor TV-home .05 level
	TV-class	54		94.04		
	Face-to-face	98		101.01		
Political science	TV-home	244	Final exam	108.69	Analysis of variance	NSD
	TV-class	51		106.83		
	Face-to-face	58		107.41		
English 101 (second offering)	TV-home	33	Final exam	23.85	Matched pairs	NSD
	Face-to-face (evening)	33		23.79		
English 102	TV-home	69	Final exam	21.75	Analysis of variance	NSD
	Face-to-face	24		21.95		
Social science 102	TV-home	45	Final exam	74.64	Matched pairs	NSD
	Face-to-face (evening)	45		73.89		
Biology 102	TV-home	153	Final exam	110.16	Analysis of variance	Favor TV-home .05 level
	Face-to-face	153		106.30		
Mathematics	TV-home	28	Final grade (A=4.0)	2.97	Covariance	NSD
	Face-to-face	28		3.17		

Second-year results.—No significant differences were found except for humanities and biology. Both differences were in favor of the TV group. The following is a summary of results:

Class	*Instruction method*	*Number*	*Criterion*	*Score*	*Analysis technique*	*Significance*
Accounting 101	TV	53	Final and midterm exams	[1] 79.38	Covariance	NSD
	Control	44		[1] 76.05		
English 101–102 [2]	TV	53	NA	NA	Covariance	NSD
	Control	40				
Humanities 201–202	TV	69	Exams and final	[1] 379.16	Covariance	.01 favoring TV group
	Control	73		[1] 345.73		
Social science 101 [2]	TV	56	Critical thinking posttest	[1] 29.00	Covariance	NSD
	Control	23		[1] 26.47		
Biology 101	TV	26	Periodic and final exams	NA	Covariance	Favor TV .05 to .10 level
	Control	26				
Biology 102	TV	153	Periodic and final exams	NA	Covariance	Favor TV .05 level
	Control	153				
Child psychology	TV	46	Final exams	74.46	*t*-test	NSD
	Control	46		69.89		
Shorthand	TV	26	Final exams	109.22	NA	NSD
	Control	64		104.64		

[1] Scores adjusted for preinstruction individual differences.

[2] TV and control section for each course taught by same teacher.

Achievement comparisons for the third year.—The first two years of the experiment compared achievement of TV at home students with that of students taught face-to-face in the classroom. In the third year, experimentation was undertaken to use the TV series for direct instruction of classroom groups of normal college age day-time students. Experimental and control sections were matched as carefully as possible or made equivalent through random selection. Comparisons were continued for adult age afternoon, evening, and home TV students. The following is a summary of results:

Class	*Instruction method*	*Number*	*Criterion*	*Score*	*Analysis technique*	*Significance*
Social science 102	TV-home	29	Exams	129.13	Covariance	Favored TV-home group .01 level
	TV-class	29		113.01		
	Face-to-face	29		121.00		
Physical science 101	TV-home	NA	Exams	212.41	Covariance	
	[2] TV-class I	NA		215.01		(1)
	Face-to-face I	NA		230.85		(1)
	TV-class II	NA		118.47		(1)
	Face-to-face II	NA		185.29		(1)
Humanities 201	TV-class	31	Exams	176.16	Covariance	NSD
	[3] Control	44		181.11		
Humanities 202	TV-class	20	Exams	152.01	Covariance	SD .01 level favoring face-to-face
	Control	31		176.10		
Psychology	TV-home	60	Exams	187.27	Covariance	(4)
	Face-to-face (afternoon)	30		178.83		(4)
	Face-to-face (evening)	21		164.48		(4)
	Combined face-to-face	51		172.92		(4)
Mathematics	TV-home	35	Exams	140.23	*t*-test	SD .01 level favoring TV-home.
	Face-to-face (evening)	30		122.76		
Speech	TV-home	17	Exams	118.34	Covariance	SD .01 level favoring TV-home over either face-to-face.
	TV-class	15		109.65		
	Face-to-face (day)	48		106.19		
	Face-to-face (evening)	37		105.68		

[1] I refers to class meeting at Wright Branch of Chicago Junior College. II refers to class meeting at Wilson Branch of Chicago Junior College.

[2] On pretest measure of Otis and subject matter showed a significant difference in groups before instruction (.01 level). Using adjusted mean scores for covariant analysis the following were significant: Wright TV-Home differed significantly from Wright Face-to-face at the .05 level. All others were nonsignificant.

[3] Control groups were daytime students meeting in face-to-face classes in classrooms on the campus with same instructor as TV.

[4] TV favored at .01 level over evening class. Afternoon class favored over evening class at .05 level. Different instructors for all three methods of instruction.

Conclusions.—The authors concluded after the three years of study that:

1. College courses can be successfully presented over open-circuit TV without adjustment of the primary objectives or learning materials.
2. Classroom standards of instruction and evaluation can be maintained for courses taught to students in the home by open-circuit TV.
3. While significant differences for both TV and face-to-face instruction were frequently found in the studies, the authors felt these differences were based within the teaching-learning situation itself. More differences between variables in a teaching-learning situation exist than do variables in a teaching method.
4. "When evaluated by the techniques of measurement and analysis used in this experiment, television instruction is a

thoroughly effective means of extending college opportunities to at-home students in all subject areas explored in the project."

78. EVANS, RICHARD I. "An examination of students' attitudes toward television as a medium of instruction in a psychology course." *Journal of Applied Psychology* 40 (1956), 32–34.

> *Problem*: Does experience with a TV-course motivate students to take other TV-taught courses, and what effect do live face-to-face discussion sections have on student-teacher relationships?
>
> *Sample*: 74 college students.
>
> *Subject taught*: Elementary psychology.
>
> *Key variables*: Student attitude toward TV as means of instruction, and contact sessions with TV teacher.

The attitudes of the subjects (*S*s) toward television instruction enrolled in an elementary psychology course taught partly by television and partly through on-campus discussion groups were determined. Seventy percent of them revealed an interest in taking another course involving television instruction, 13 percent would not do so, and 16 percent were undecided. Among the "open-end" question responses, a feeling was revealed that television lectures were better developed than traditional classroom lectures, involved fewer disturbing interruptions from students, but lacked opportunities for class participation and were subject to technical electronic interruptions.

The attitudes toward supplementary class discussions revealed responses which favored them in 42 percent of the cases and felt them of no appreciable importance to learning in addition to television lectures in 56 percent. Two percent of the *S*s were "undecided" concerning their value. Among these "open-end" question responses it was reflected that their importance centered around advantages gained through some face-to-face contact with the instructor for those favoring them, and the feeling that television lectures were sufficiently complete in themselves by those who found no need for them.

79. EVANS, RICHARD I. An exploratory investigation of the psychological and educational impact of a filmed dialogue with Carl Jung. *Conversations With Carl Jung and Reactions From Ernest Jones.* Princeton: D. Van Nostrand, 1964. p. 159–168.

> *Problem*: Determine the relative effectiveness of a filmed interview and printed communication on student learning and attitude change.
>
> *Sample*: 40 psychology of personality seniors and 22 experimental psychology sophomores.
>
> *Subject taught*: A one-hour filmed interview with Carl Jung.
>
> *Key variables*: Learning, ability, attitude, personality, and filmed and printed communication presentations.

In mid-semester, seniors taking psychology of personality took a pre-achievement standardized test based on the content of the interview and the vocabulary scale of the Wechsler Adult Intelligence Scale (WAIS). Students were then divided into two groups on the basis of pre-achievement and WAIS scores. Six weeks later, one group saw the filmed interview and the other group read the printed transcription of the film. Both groups then took the achievement test. Both groups learned significantly from their presentation (.01 level), but the difference between groups was not significant.

At the beginning of the semester, 22 experimental psychology sophomores took a semantic differential (evaluative factor) instrument to assess attitudes toward interviewing as a teaching device, toward Carl Jung as a person, and toward a group of his theoretical concepts.

The sophomores were also administered the Rosenzweig Picture-Frustration Study, Taylor Anxiety, Wesley Rigidity, Edwards PPS, the *F*-Scale, the Thematic Apperception Test (TAT), and the Allport-Vernon Study of Values scales. Two months later this group saw the Jung filmed interview and took the semantic differential scales again.

Students' attitudes toward all three concepts on the semantic differential changed significantly after seeing the film. Some students shifted favorably toward Jung as a person but remained neutral or reacted unfavorably toward his theoretical concepts; other students reacted unfavorably toward Jung but favorably toward his concepts. There was a significant negative correlation between rigidity (Wesley Rigidity scores) and change in attitude. Scores on the Rosenzweig PF test tended to indicate that extrapunitiveness was positively associated and impunitiveness was negatively associated with attitude change. Scores on the Allport-Vernon seemed to indicate that students emphasizing social values were more favorable toward Jung, whereas students emphasizing aesthetic values changed less.

80. EVANS, RICHARD I., H. BURR RONEY, and WALTER J. MCADAMS. "An evaluation of the effectiveness of instruction and audience reaction to programming on an educational television station." *Journal of Applied Psychology* 39 (1955), 277–279.

Problem: Achievement differences in TV only, face-to-face, and combined TV and face-to-face interaction.

Sample: 221 college students.

Subjects taught: Elementary psychology and elementary biology—University of Houston.

Key variables: TV, face-to-face, and combined TV and face-to-face learning changes.

Psychology

A total of 96 students were enrolled in a face-to-face psychology class, 17 were enrolled in a TV section which received lectures over ETV Station KUHT, Houston, Texas, and completed correspondence problems mailed in to instructor, 30 were enrolled in a TV section which received lectures via TV station but came to campus for two discussion sections per week. Achievement was evaluated on the basis of 150-item standardized final examination. Mean final examination scores were (1) face-to-face class: 96.11, (2) TV plus correspondence: 98.00, and (3) TV plus campus discussions: 99.04. The same instructor was used for all sections of the course. The Fisher t-test showed no significant statistical difference between mean examination scores. Authors concluded that TV is as effective a means of instruction as face-to-face teaching.

Biology

Two groups matched on basis of college class, grades, and sex, each numbering 78, were taught elementary college biology by the same instructor. One group was taught face-to-face, the other had instruction lectures by TV, discussions met face-to-face twice a week. Achievement was measured on 70-item objective type mid-semester examination. Mean score for face-to-face group was 50.17 and for TV group was 45.82. Authors reported no statistically significant difference for matched groups. Authors concluded that TV is as effective a means of instruction as face-to-face instruction for college elementary biology.

An additional part of this study is the reaction of the Houston ETV audience to educational television programing. It is not reported in this abstract. See original study for this data.

81. EVANS, RICHARD I., RONALD G. SMITH, and WILLIAM K. COLVILLE. *The university faculty and educational television: hostility, resistance, and change. A social psychological investigation in depth.* USOE Project No. 051. Houston: University of Houston, 1962. (Offset).

Problem: To determine attitudes of university professors toward ITV before and after participating in making videotapes, as a natural field setting exploration of the forced compliance dimension in Festinger's dissonance theory.

Sample: 319 professors at a large, urban southwestern university.

Key variables: Participation, attitudes, self-concept and other personality and behavioral measures.

Professors were administered a semantic differential instrument to determine attitudes toward ITV and a number of other concepts related to the university instructional complex as well as self-concept items. From analysis of this, the 60 most favorable and the 60 least favorable professors were selected. These were interviewed in depth, exploring both personality and instructional variables. Members of two complete university departments ($N=20$) that had resisted ITV were selected to prepare, produce and present several videotapes as a self-teaching improvement device.

Chi squares determined significance of intergroup differences, and questionnaires were subjected to a centroid factor analysis. Among the findings was an indication that 85 percent of the faculty regarded themselves as good teachers, although student responses were significantly less favorable. Pro-ITV teachers were significantly more variable in teaching and evaluation techniques, more interested in research, had more teaching experience, were more tolerant of psychological interviews, night students, and student activities; were less concerned about economic rewards, and were less likely to have colleagues who agreed with their views.

The attitudes of the members of the two departments who participated in the videotape project were modified in a direction more favorable to ITV. One department that had participated in the video-tape project decided to do an ITV course; one is now using the taped materials in conjunction with traditional instruction.

82. EVANS, RICHARD I., BETTY A. WIELAND, and CHARLES MOORE. "The effect of experience in telecourse on attitudes toward instruction by television and impact of a controversial television program." *Journal of Applied Psychology* 45 (1961), 11–15.

Problem: Effect of previous experience in telecourses on attitudes toward TV as an instructional medium.

Sample: 160 University of Houston students.

Subject taught: Psychology.

Key variables: Attitude toward TV as a medium of instruction, experience in TV-taught classes.

Two groups of students were selected on the basis of prior experience in television-taught courses. Forty-five students had enrolled in TV classes and received grades in these classes, and 115 students had no prior experience in TV-taught courses. A modified Osgood type semantic differential (evaluative dimension) test was administered to all subjects. The *t*-test for the difference between the means of the two groups was not significant.

The good-bad scale on the Osgood test was used to evaluate attitudes toward concept related to methods of course presentation by classroom lecture and television lecture.

A *t*-test of the median values of the TV-experienced group yielded a difference significant at the .01 level. This difference favored classroom instruction. Authors infer that exposure to TV as a means of instruction results in a less favorable attitude toward it, but they also suggest an alternate conclusion that attitude toward TV may be a result of grades earned in the course. (A *phi* coefficient between attitude and grades was .36 and significant beyond the .01 level.)

The contention proposed here is that, if all related variables (e.g., attitude toward the instructor, the subject matter itself, general motivation arousal characteristics of the course) could be held constant, television as a teaching medium would take its place along side other educational media; that is, they are all equally well received in proportion to the extent that effective learning principles are implemented in their use.

This same study reported the extent to which a single educational TV program could change attitudes of ETV viewers toward a controversial subject. See original study for this data.

83. FORD FOUNDATION AND THE FUND FOR THE ADVANCEMENT OF EDUCATION. "The national program on the use of television in the public schools [n.p.]. Report of the second year 1958–59." NAEB Research Fact Sheet, Series I, 92, *NAEB Journal* 20 (July 1961), 1–2. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: *First year*: nearly 40,000 students in more than 200 schools; *second year*: an increased number of both participating schools and students.

Some of the subjects taught: Social science, science, physical education, safety, history, English, mathematics, chemistry, physics.

Key variables: TV teaching, face-to-face teaching.

After the first 2 years, students in large TV classes learned as much as, and in many cases significantly more than students of equal ability in face-to-face taught classes.

84. Fordham University. Training by television: The comparative effectiveness of instruction by television, television recordings, and conventional classroom procedures. Technical Report SDC Report 476–02–2. Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center. *Audio-Visual Communication Review* 1 (1953), 61. (Abstract).

Problem: Determine the relative effectiveness of television, kinescopes shown on television, and face-to-face instruction; the factors that determine superior programs, and attitudes.

Sample: Naval trainees.

Subject taught: Training lesson.

Key variables: Narration and animated presentations; learning and attitudes; face-to-face, ITV, and kinescope methods.

Live television and kinescopes were superior to face-to-face presentations; there were no significant differences between live television and kinescope *presentations*.

Direct narration was superior to animated sound film, but the combination of direct narration and animated film was not as effective.

Trainees were generally favorable toward television.

85. Frazier, Alexander, and Lewis D. Evans. *Testing the effectiveness of two-purpose television programs in contributing to both teacher and pupil learning (Elementary Science).* USOE Grant No. 7–33–045.00. Columbus: Center for School Experimentation, Ohio State University, Dec. 27, 1960. (Offset).

Problem: Determine effectiveness in teacher and pupil learning by ITV.

Sample: 151 teachers and 4,814 third- and fourth-grade pupils from Columbus, Ohio and nearby schools.

Subject taught: Elementary science.

Key variables: Attitude, pupil interest, achievement; ITV presentation.

Pupils and teachers saw 10 half-hour ITV lessons on elementary science. Teachers took a pre- and post-attitude questionnaire, and 20 teachers were interviewed. Teachers also evaluated the program using an 18-item questionnaire. Fourth-grade pupils took the STEP test.

Teachers significantly increased their feelings of confidence in teaching elementary science (.01 level). Teachers were willing to have further consulting services for other areas besides elementary science. Teachers reported pupils showed more interest in science, asked a wider range of questions, and brought more material to class. There were no significant differences in achievement scores of fourth-grade pupils during the study. Some teachers thought that half-hour programs were too long for third graders.

86. Frank, Joseph Henry. "An evaluation of closed circuit television for interceptor pilot training." *Dissertation Abstracts* 15 (1955), 2060–2061.

Problem: Determine the relative effectiveness of understanding and remembering weather conditions when presented by audio alone and by television.

Sample: Air Force trainees selected at random during their training period.

Key variables: Television and audio-alone presentation; learning, and attitudes.

Subjects at Tyndall Air Force Base, Florida, received six sets of weather briefings, either by audio only or by audio and television presentation (showing weather charts). The audio portion of each of the treatments was the same. Retention of the weather presentation was determined by a short test having four multiple-choice and one problem-solving question.

Analysis of variance results showed no significant differences in test scores among the three situations (different kinds of training "planes") in which the trainees were tested. After pooling the test scores, it was found that trainees receiving the weather by television had significantly higher scores on the information tests (.01 level) than did those receiving the audio only. An attitude questionnaire also showed that subjects favored the television presentation more than they did the audio-only presentation.

87. **French, Joseph L.** *A comparison of student attitude in three instructional conditions: small classroom, instructional television, and large lecture hall.* [Columbia:] University of Missouri, Aug. 21, 1963. (Mimeographed).

Problem: Determine students' attitudes toward small classroom, ITV, and large classroom presentations.

Sample: First semester, 94 students in two classrooms; second semester, 74 ITV students; fourth semester, 167 ITV students; fifth semester, 237 students in a large lecture room.

Subject taught: Social foundations of education.

Key variables: Face-to-face presentation in small classrooms, ITV presentation, and face-to-face presentation in a large classroom; attitudes.

The first semester, students were taught in a small classroom. The next three semesters, the course was presented on ITV. The fifth semester, students were in a large lecture room. The same professor taught all sections. There were no significant differences between group means in scholastic aptitude, grade point average, previous coursework pattern, or age. Scholastic aptitude means for all four groups were about one-half a standard deviation above the mean for university freshmen; none of the students were on probation and all were enrolled for 12 hours or more of coursework. Attitude scales were developed from those used in another study. (See abstract of Neidt and French.) Likert scales were constructed to measure attitudes toward method of instruction, teacher, and subject. A semantic differential instrument was used to determine teacher characteristics, and a *Q*-sort to make a teacher rating. The *Q*-sort involved students arranging 22 statements about a teacher in an "ideal" order, and a week later in an order describing their education teacher. All attitude scales were given shortly before the end of the course.

The attitude scales intercorrelated as follows:

	[2]	[3]	[4]	[5]
1. Method (Likert)	.67	.59	.52	–.04
2. Teacher (Likert)		.58	.74	.03
3. Subject (Likert)			.40	.06
4. Teacher characteristics (sem. diff.)				.04
5. Teacher Rating Scale (*Q*-sort)				

The *t*-tests on the scores of the instruments numbered above yielded the following significant differences: (1) face over TV_2, face over large lecture, TV_1 over large lecture, TV_2 over large lecture; (2) face over TV_2, face over large lecture, TV_1 and TV_2 both over large lecture; (3) face over large lecture, TV_1 over all presentations, and TV_2 over large lecture; (4) face over all presentations, and TV_2 over large lecture; and (5) face over TV_2, and TV_2 over lecture. (TV_1 and TV_2 indicate first and second experimental presentations over ITV which were made the second and fourth semesters of the experiment.)

88. **Fullerton, Billie J.** "The comparative effect of color and black and white guidance films employed with and without 'anticipatory' remarks upon acquisition and retention of factual information." *Dissertation Abstracts* 16 (1956), 1413.

Problem: Determine retention using black and white and color films with and without anticipatory remarks.

Sample: 551 eleventh- and twelfth-grade students from Clinton, Elk City, Hydro, and Weatherford, Okla.

Subjects taught: *Library Organization, Heredity and Environment, Choosing Your Occupation, Your Earning Power.*

Key variables: Black and white, color, and anticipatory remarks; learning, and retention.

Students were randomly assigned to five groups: the first saw color films, the second heard anticipatory remarks and saw color films, the third saw black and white films, the fourth heard anticipatory remarks and saw black and white films, and the fifth (control) received no instruction. All students took a factual information test before, immediately after, and 6 weeks after the screenings.

Analysis of covariance indicated that the scores of students in the black and white groups were significantly higher than the scores of students in the color group on both the immediate and delayed posttests. Scores of students in the films-only group were significantly higher than scores of students in the anticipatory remarks group on both the immediate and delayed posttests.

89. FULTON, W. R., and O. J. RUPIPER. *Selected vicarious experiences versus direct-observational experiences of pre-service teachers in the foundation areas of professional preparation at the University of Oklahoma.* USOE Project No. 192. Norman: College of Education, University of Oklahoma, 1961. (Offset).

> *Problem*: Determine the relative effectiveness of film and slide sequences and direct observation.
>
> *Sample*: About 270 students in three education classes at the University of Oklahoma.
>
> *Subjects taught*: The school in American culture, human growth and development, and educational evaluation and guidance.
>
> *Key variables*: Film and slide sequences, direct observation; attitude, and learning.

Students and teachers were randomly assigned to either film and slide or direct observation treatments. Some films were selected from existing films; other films and slides were specially produced. All students took the SCAT and MTAI as pre- and posttests, and the Sims Social Class Identification Occupation Rating Scale was administered as a pretest. The time given to films and direct observations was the same.

Achievement tests for each of the three courses were constructed and the low discriminating items were culled out. Odd-even split-half *r*'s with Spearman-Brown prophecy formula were .78 (SE_m=3.84), .62 (SE_m=4.20), and .62 (SE_m=4.28) for the School in American Culture, Human Growth and Development, and Educational Evaluation and Guidance courses respectively. Achievement test scores correlated .45, .57, and .50 with final grades in the courses.

Analysis of covariance indicated no significant differences among any of the three courses for either of the two treatments, except that in the School in American Culture course, the film and slide group made significantly higher scores on the posttest than the direct observation group (.01 level).

It was concluded that in basic professional education courses, observational experiences by films and slides are more effective than direct observation. In later courses, educational concepts could be acquired as effectively through films and slides as by direct observation.

90. GARRY, RALPH J. *Report of research on the integration of science teaching by television into the elementary school program.* USOE Grant No. 719008.09. Boston: Boston University, Oct. 31, 1960. (Mimeographed). (See studies by Homer J. Dietmeier, Mary E. Kraft, and A. Cornelia Sheehan.)

91. GARRY, RALPH, and EDNA MAURIELLO. Summary of research: *Parlons Français* I, II, III (videotape edition) and *Parlons Français* I (film edition). [n.p., n.d.]. (Mimeographed). See also: Summary of research on *"Parlons Français"*: First-year program. USOE Grant No. 719021.09, Sept. 14, 1960, and Summary of research on *"Parlons Français"*: year two. USOE Grant No. 719112 [n.d.]. Both published at Boston: Massachusetts Council for Public Schools. (Mimeographed).

> *Problem*: Determine the effectiveness of teacher preparation, followup practice of pupils, and teachers' "fluency".
>
> *Sample*: See below.
>
> *Subject taught*: French.
>
> *Key variables*: Teachers' fluency, kind and

amount of followup practice, and teachers' preparation.

The research covered the following seven projects:

1. *Level I videotape*: 56 fourth-grade public school classes in suburban communities near Boston were studied for (a) effects of fluency of classroom teacher, (b) using tape recordings of program sound tracks vs. live followup practice, and (c) the value of televised teacher preparation programs;

2. *Level I videotape*: using 20 fourth-grade public and parochial school classes in Boston, this study repeated project 1 to determine (a) differences in achievement between urban and suburban children, (b) the effectiveness of disc vs. the tape recordings in project 1, and (c) the stability of the previous results;

3. *Level I videotape*: using grades 1–6 in parochial schools, this study determined performance differences of classes beginning the course at different levels;

4. *Level II videotape*: using 40 fifth-grade suburban public school classes in the second year of *Parlons Français*, this project studied (a) effects of teachers' fluency, (b) the relative value of followup practice with records vs. live practice, and (c) the value of special teacher recordings as teacher preparation devices;

5. *Level II videotape*: using 19 sixth-grade public school classes, this project studied proficiency after 3 years' study, of groups in projects 1 and 4. Performance of each group was compared (a) with groups under each other category, (b) with a control group which had had mixed types of practice, and (c) with all other groups;

6. *Level III videotape*: over 200 sixth-grade classes (8,000 pupils) in public and parochial schools were given group listening comprehension and reading tests. Teachers filled out a questionnaire on their previous experience with French, the amount and type of followup practice used, their attitudes and their students' attitudes toward French;

7. *Level I film*: 1,750 fourth-grade students in public and parochial schools in six areas took a group listening comprehension test.

In the first three projects, all classes saw two 15-minute French programs and had two 15-minute followup periods each week. Half the teachers organized and directed their own practices and the other half used recordings for followup. Fluent teachers averaged 3 years or more of high school or college training in French, while the nonfluent group had little or no formal French study. In projects 1 and 5, half the teachers were provided weekly half-hour programs by TV, the others none; in project 4, half the teachers were provided with special records to increase their French fluency, the others none. Teachers were randomly assigned to classes. Students in projects 1–5 took a multiple-choice listening comprehension test.

For projects 1, 2, 4, 5, 6, and 7, classes having 30 minutes or more followup each week scored significantly higher than those with less. Scores on the intelligence test used were a poor predictor of achievement of first level *Parlons Français*. Comparable results were achieved when the course was started at any one of grades 1–6. The effect of missing programs was greatest at the first level. Over a 3-year period, however, the effect of missing programs was not a significant factor in individual achievement. Boys' achievement was equal to girls'.

Total test scores of students with moderately fluent teachers were significantly higher than those of students with nonfluent teachers (project 4). Over a 2- or 3-year period, students of moderately fluent teachers performed better than those of nonfluent teachers in listening comprehension, rhythm and intonation, and spontaneous usage, and this distinction was particularly significant at the third level (projects 5 and 6). Pronunciation and listening comprehension scores of students of nonfluent teachers during either of the first two levels were equal to scores of students of moderately fluent teachers. Classes taught by teachers who were enthusiastic toward French scored significantly higher than those taught by nonenthusiastic teachers. Children in classes of teachers who watched TV teacher preparation programs regularly performed no better than classes whose teachers did not (projects 1, 5, 6, and 7). There was no relationship between teacher's fluency and the attitude of his students toward French.

Classes of moderately fluent or nonfluent teachers using recordings regularly had better results in rhythm and intonation than classes which did not. In project 2, students with moderately fluent teachers had higher achievement in pronunciation and spontaneous usage with live followup practice than with recordings, but nonfluent teachers had better results in these areas using recordings.

Over a 3-year period, classes having the greatest variety of followup practice achieved higher scores than those having only one type (projects 1, 4, and 5).

92. **Geddes, Dorothy Clara.** "The use of television in teaching tenth year mathematics: the effectiveness of teaching tenth year mathematics by television and a classroom teacher as compared with the traditional method of instruction by a single classroom teacher." *Dissertation Abstracts* 22 (1962), 4293.

Problem: Compare the effectiveness of teaching tenth-grade mathematics by face-to-face and television, or by face-to-face methods.

Sample: 232 students in five public New York high schools.

Subject taught: Tenth-grade mathematics.

Key variables: Television and face-to-face presentation; attitudes, and achievement.

Two intact classes from each school were used as experimental and control groups. The experimental classes saw three 30-minute telecasts each week for a year and had face-to-face instruction the rest of the time. The control group had face-to-face instruction only. The same teacher taught both sections in each school. All students took the Shaycoft Plane Geometry Test and the Tenth-Year Mathematics Regents Examination as criterion variables. Students took the Watson-Glaser Critical Thinking Appraisal and Multiple Aptitude Tests 8 and 9 as pre- and posttests. Students also took an attitude toward mathematics instrument as pre- and posttests, and an evaluation of television (degree of instructiveness, quality of instruction, and adequacy of televising) instrument as a posttest.

There were no significant differences between face-to-face and face-to-face and televised instruction as determined by scores on the Watson-Glaser, MAT, Spacial Relations, and on the achievement measures. Students' and teachers' attitudes were generally favorable.

93. **Glasgow, M. W.** *A study of the relative effectiveness of selected approaches to the in-service education of teachers in the utilization of in-school radio and television broadcasts.* USOE Project No. 253. Norman: University of Oklahoma [n.d.]. (Offset).

Problem: Determine the relative effectiveness of four methods of inservice education in using radio and TV in the classroom.

Sample: 181 elementary and secondary schoolteachers and their pupils.

Subject taught: Using radio and TV in the classroom.

Key variables: Workshops, supervisory visits, printed material, films and tapes.

Teachers were randomly assigned to one of four methods of inservice training: workshops, supervisory visits, printed material, films and tapes.

Pupils in each course took achievement tests. Odd-even split-half r's using the Spearman-Brown prophecy formula were algebra, .79; chemistry, .89 and .89; elementary science, .97 and .82; high school mathematics, .92; Oklahoma history, .92 and .92; physics, .86 and .86; social studies, .77 and .83; and U. S. history, .87 and .87. Two reliabilities given for the same course indicates measurement at two different years. Teachers completed a 20-item questionnaire.

Analysis of variance indicated no significant differences in pupils' scores for any of the four training methods. Teachers were favorable to an inservice program and consistently preferred the workshop to the other (visits, printed material, films and tapes) methods.

94. **Glock, John William.** "The relative value of three methods of improving

reading—tachistoscope, films, and determined effort." *Dissertation Abstracts* 15 (1955), 2072.

Problem: Determine the relative effectiveness of using a tachistoscope, films, and determined effort to improve reading.

Sample: About 100 pupils.

Subject taught: Reading.

Key variables: Tachistoscope, film presentation, and determined effort; learning of reading skill.

Pupils were divided into four groups: a control group of 37 pupils, and three experimental groups of about 20 pupils each. One group followed the instruction manual for the Keystone tachistoscope, another group saw a series of reading films prepared by James B. Stroud of the State University of Iowa, and a third group, the "determined effort" group, used interesting reading materials, studied vocabulary, and listened to periodic talks from faculty members emphasizing the importance of improvement. All students took the Iowa Silent Reading Test before and after the experiment, and the Robinson-Hall Test of Reading Ability for History at the end. The three experimental groups were matched on reading test scores, an intelligence measure, and grade averages. Analysis of variance indicated no significant differences among the three groups on these criterion measures.

Using scores on three reading tests, analysis of covariance technique indicated the determined effort group had a significantly higher reading rate than the other two groups at the end of the 4-month experimental period. The determined effort group also had significantly higher comprehension of the material.

95. GORDON, MORTON J. *Television education in elementary school speech improvement.* USOE Project No. 425 [n.p., n.d.]. (Offset).

Problem: Determine the relative effectiveness of face-to-face and television presentation.

Sample: 535 third-grade pupils in 16 Oahu schools.

Subject taught: Five speech sounds: [θ, ð, I, ε, U].

Key variables: Face-to-face and television presentation, retention, racial ancestry, size of groups.

California Test of Mental Maturity (CTMM) scores were available for all pupils. All pupils took an adaptation of the Bryngelson-Glaspey speech improvement test, with 26 pictures and 34 sentences. Intercorrelations of four selected judges on a sampling of 29 pupils were .83, .87, .88, and .89. One group had 15-minute ITV speech lessons 2 days a week and had face-to-face lessons 3 days a week. Another group had similar lessons all by face-to-face presentation, and a third group received no special training except as ordinarily provided by the Hawaii school curriculum.

At the end of the training program, all students took the speech test as a posttest. Pupils in the television and face-to-face groups had significantly fewer errors than pupils in the group receiving no special training, but there were no significant differences between television and face-to-face pupils receiving special training. These relative standings persisted 4 weeks later.

96. GORDON, MORTON J. "Third grade television-classroom articulation program." *Journal of Speech and Hearing Disorders* 25 (1960), 398–404.

Problem: Effectiveness of TV in presenting remedial speech training.

Sample: 169 pupils in 20 Hawaiian schools.

Subject taught: Remedial speech.

Key variables: Improvement in articulation of [θ] and [ð] sounds, TV teaching, face-to-face teaching.

A total of 87 students with articulation problems in nine experimental groups were taught remedial speech by viewing two televised lessons, 15 minutes long, each week and attending three face-to-face lessons each week. In nine control groups 82 students with the same articulation problems were taught remedial speech by their regular classroom teacher in five face-to-face sessions, 15 minutes long, each week. Recordings were made of all students with articulation problems and evaluated by a jury of experts to determine similarity of experimental and control groups. Classroom teachers followed a syllabus of keeping experimental and control group routines comparable.

Two weeks after instruction, all students were retested and tape recorded. The same jury that originally evaluated the students evaluated the improvement in articulation after instruction.

Results.—Scores from the California Short Form Test of Mental Maturity were used to determine language IQ differences. There was no significant difference in IQ for the two groups. Scores for articulation improvement were obtained by subtracting the number of posttest articulation errors from the pretest articulation errors. The TV-taught group mean was 9.8 and the face-to-face taught group mean was –0.4. The negative score indicated that students made more errors on posttest than pretest. This difference was significant in favor of the TV group at the .001 level. Male students in the TV-taught group differed significantly from the male students in the face-to-face taught group more than female students in the same groups.

Conclusion.—TV teaching of remedial speech by a trained speech correctionist produces significantly more improvement in articulation than face-to-face teaching of remedial speech by the regular classroom teacher.

97. GORDON, OAKLEY J., KEITH M. ENGAR, and DONALD R. SHUPE. *Challenging the superior student by making the study of Russian available in the elementary school curriculum via television.* USOE Grant No. 7–54–0050–024. Salt Lake City: University of Utah, 1963.

Problem: Determine the relative effectiveness of learning by face-to-face and television presentation; students' attitudes toward television, and the relative effectiveness of challenging superior pupils.

Sample: 395 fourth- and fifth-grade pupils taking Russian and 205 fourth- and fifth-grade pupils not taking Russian. Of those taking Russian, all but 54 took it by television.

Subject taught: Russian.

Key variables: Television and face-to-face presentation; attitude, ability.

All pupils took the Pintner-Durost General Ability Test, and fourth-grade pupils took the Metropolitan Achievement Test. Pupils' grades were also available in four subject matter areas, and the classroom teacher evaluated each pupil twice a year on a 39-item dichotomous response questionnaire having three factors: "self-initiated drive," "leadership," and "emotional control." Pupils enrolled in Russian also took Russian achievement tests and oral tests, and twice a year filled in a 7-item questionnaire about interest in the Russian class. Parents also filled out a 25-item questionnaire once during the year. Samplings of Russian classes were filmed, and these films were evaluated as to pupils' interest. Finally measures were also made of socio-economic status (SES) level and fathers' occupations were determined. The mean IQ of superior students was 121 and of average students was 105. The study was conducted over a 3-year period.

Average-ability pupils taking Russian had significantly higher classroom grades than average-ability pupils not taking Russian. A similar finding was found for high-ability pupils. There were no significant differences between classroom grades of average-ability pupils taking Russian and superior-ability pupils not taking Russian.

Pupils taking Russian by face-to-face presentation tended to have higher Russian achievement scores than pupils taking Russian by ITV. Relative performance of ITV pupils might have been a function of the follow-up teacher's teaching abilities.

Pupils' interest in Russian tended to decrease over a period of time. Classroom behavior of superior pupils taking Russian was rated higher than classroom behavior of superior pupils not taking Russian.

98. GORDON, OAKLEY J., EDWIN C. NORDQUIST, and KEITH M. ENGAR. *Teaching the use of the slide rule via television.* [Salt Lake City]: KUED, University of Utah, July 1959. (Offset).

Problem: Determine the relative effectiveness of ITV and face-to-face presentation.

Sample: 26 ITV students and 11 face-to-face students the first semester; 17 ITV students and 11 face-to-face students the second semester; 38 face-to-face students from previous semesters.

Subject taught: The slide rule.

Key variables: Learning, study time, and on-campus, off-campus, credit, and noncredit students; ITV and face-to-face presentation.

The course was organized into 20 half-hour presentations, and was shown live the first semester and as a kinescope the second semester. The same teacher taught both ITV and face-to-face sections.

Analysis of variance indicated no significant differences in final examination scores between ITV and face-to-face students for either semester.

Analysis of variance run on on-campus first-semester students of high and low grade point average indicated that high GPA students had significantly higher final examination scores than low GPA students, and that there was a significant (.01 level) interaction between GPA level and presentation method. Mean scores of ITV high GPA students were higher than face-to-face high GPA students, and the reverse was true for low GPA students.

Analysis of variance for exercises means for 29 on-campus ITV students, 14 off-campus credit ITV students, and 13 off-campus noncredit ITV students indicated a nonsignificant *F* ratio, although the on-campus ITV students tended to have higher mean exercises scores than the off-campus credit students, who in turn tended to have higher mean exercises scores than the off-campus noncredit students.

Since the course was offered more than once a day, students were able to view the same lesson more than once if they wished. Face-to-face students viewed about 2½ lectures twice, on-campus ITV students about one lecture twice, and off-campus students about 4 lectures twice. Students with low GPA averages watched repeats more frequently than students with high GPA averages.

There were no significant differences between groups in the amount of studying reported, and no significant correlations between amount of study time and either final examination grade or mean exercises grade, except that the correlation between study time and exercises means for the on-campus ITV group was –.45.

99. **Gould, Orrin Everett.** "The character of observation under closed-circuit television, classroom visitation, and instructional television films in an introductory education course." *Dissertation Abstracts* 21 (1960), 97–98.

Problem: Determine the relative effectiveness of television, films, and direct observation.

Sample: University of Minnesota students in sections of 25–40.

Subject taught: Observation.

Key variables: Direct observation, television, and film observational methods; students' perception of educational value, and students' evaluations of effectiveness.

Six sections were randomly assigned among the three treatment methods, and students were randomly assigned to lab sections. Students took the Miller Analogies Test, made reports of perceived incidents of educational significance during observations, took a film test of observation skills, and made a report on observation experiences. Students observed five times a semester by their method and one time by each of the other methods.

The author concluded that the three methods of observation tended to supplement rather than replace each other, that there were no significant differences among methods with respect to educational objectives, and that students tended to favor direct over television observation, but that either of these was preferred over film. The films used were produced by McGraw-Hill and Indiana University.

The pattern of incidents the students perceived varied over treatments. Students were most satisfied with their method whichever it was. There were no significant differences among students in the different groups on film test of observation skills scores.

100. **Grant, Theodore S., and others.** Effectiveness of television within the dental laboratory. Theo. S. Grant and Irving R. Merrill, *Television in Health Sciences Education.* USOE Project No. 064. San Francisco: University of California, San Francisco Medical Center, Sept. 30, 1963. p. 28–33. (Offset).

Problem: Determine the relative forgetting during a two-day period between lecture presentation and individual laboratory work, and to determine the relative effectiveness of ITV and lecture-slide presentations.

Sample: 59 students in Crown and Bridge Prosthetics at the University of California School of Dentistry.

Subject taught: Preparation of a tooth in a typodont for a full crown with porcelain veneer facing.

Key variables: ITV and face-to-face plus slides presentation, evaluations of student performance in laboratory work, time between instruction and activity.

Group one received ITV presentation in the laboratory and began lab work immediately. Group two received ITV presentation in the classroom and began lab work after two days. Group three received the face-to-face lecture plus slides in the lab and began lab work immediately. Group four received the face-to-face instruction plus slides in the classroom and began lab work after two days. The same instructor taught all four groups. Only portions of the ITV presentation were up to desired technical and instructional standards, and lectures were not equal in quality or time.

Students were scored on their laboratory performances. All students' lab performance products were put on a table with students' identification hidden to avoid criterion contamination.

A *t*–test indicated that a significant decrease (.05 level) in retention of the television presentations had occurred during the delay between instruction and its application. No differences were found when achievement was compared between groups receiving instructions by television and illustrated lecture, despite a televised demonstration that was satisfactory for only some steps of the preparation. Students who receive satisfactory instruction by television which is applied immediately score higher in achievement than those who receive a satisfactory illustrated lecture which is not applied for several days.

101. GREENHILL, L. P., J. J. LOTTES, and A. PAGANO. Adaptation and evaluation of a programed mathematics course for televised presentation, *Comparative research on methods and media for presenting programed courses in mathematics and English,* C. R. Carpenter and L. P. Greenhill, *eds.* USOE Grant No. 736116. University Park: The Pennsylvania State University, March 1963. p. 29–38.

Problem: Determine if a self-pacing programed textbook situation is as effective in learning as programed textbooks presented over television.

Sample: 63 students at Penn State.

Subject taught: Algebra.

Key variables: Learning from self-pacing with individual programed textbooks, and from programed textbooks, and from programed textbooks presented over TV.

Sixty-three students were randomly assigned to two treatment groups. One group received the programed material by TV, proceeding as a group, and making overt responses on prepared answer sheets. The other group worked the programed material on individual teaching machines.

All students took the SCAT as a pretest. Students also took unit tests (Kuder-Richardson [K-R] #20 r for unit tests summed=.94), a midterm (K-R #20 r=.70) and a final exam (K-R #20 r=.81).

Analyses of variance and covariance (where applicable) run on the summed unit test scores, midterm and final examinations all revealed no significant differences between the two groups on any of the three measurements.

102. GREENHILL, LESLIE, and MALCOLM MCNIVEN. "Relationship between learning and the perceived usefulness of a film." *Audio-Visual Communication Review* 4 (1956), 255–267.

Problem: Determine the relationship between subjects' perceived usefulness of a film and learning from it.

Sample: Seniors in York, Pennsylvania high school.

Subjects taught: First aid, atomic energy, how a car functions.

Key variables: Perceived usefulness, psychological goal distance, temporal goal distance, attitudes, and learning.

All subjects filled out a ranking sheet before viewing, estimating the usefulness of the films to them. Subjects then were randomly assigned to view one of the three films. In each viewing group, therefore, were students who had ranked the film first, second, or third. This served as the operational definition of psychological goal distance. One of these viewing groups was divided into three subgroups. One subgroup was told they would be expected to demonstrate their knowledge of first aid the next day, another subgroup was told they could expect a test in two months, and the last subgroup was given no special information. This was the operational definition of temporal goal distance. Subjects then took an information pretest on the content of their film. These tests were 39-item multiple-choice, and had K-R #21 reliabilities from .67 to .86. Subjects then viewed the films, took a posttest content test, a 16-item Guttman attitude scale (coefficients of reproducibility ranged from .89 to .93) and an Otis IQ test.

Second order partial correlations between attitude scale scores of perceived usefulness and learning posttest scores were significant for two of the three main film groups (.01 level). Second order partial correlations between rankings and learning posttest scores were significant for all three groups. Correlations between rankings and attitude test scores were also significant.

Analysis of variance and covariance indicated no significant differences between the learning or attitude means of the temporal goal distance groups.

103. GREENHILL, L. P., O. S. RICH, and C. R. CARPENTER. *The Educational Effectiveness, Acceptability, and Feasibility of the Eidophor Large-Screen Television Projector*. University Park: Division of Academic Research and Sciences, Pennsylvania State University, January 1962. (See also Summary No. 247.)

Problem: Determine the relative effectiveness of large-screen and small-screen television on learning, and to determine students' attitudes.

Sample: See below.

Subjects taught: Zoology, accounting, and economics.

Key variables: Large- and small-screen ITV presentation; learning, attitude, and behavioral choice.

Achievement

Zoology

The 506 students were randomly divided into three groups. There were 213 students assigned to 30-student classrooms with 24-inch receivers, 88 students to a large 400-student classroom with six 24-inch receivers, and 205 students to an auditorium with a 1,200-seat capacity with the Eidophor projector. The auditorium seats were upholstered, and students had to use lapboards. The Eidophor image was 14 x 11 feet and no student was located farther than six screen widths. In the classrooms no student was farther from a set than 12 screen widths. All students simultaneously saw two ITV lecture-demonstrations each week for a semester. Students took four course examinations. An *r* of .86 (Spearman-Brown split-half) was obtained for the final examination.

An analysis of covariance controlling on Moore-Castore scores was run on each of the four examination scores and indicated no significant differences among the three groups.

Accounting

Of 223 students, 55 were randomly assigned to the large screen projection treatment and the remaining 168 students to 30-seat classrooms. Students simultaneously saw two ITV lectures a week. Students took four course examinations and a pop quiz. Reliability coefficients for some of the tests ranged from .75 to .86 (Spearman-Brown split-half).

Five analyses of covariance (run on each of the five test scores and controlling on Moore-Castore aptitude scores) indicated no significant differences between the two groups.

Attitude

Economics

There were 170 students randomly divided into two groups. One group was assigned to the auditorium and the Eidophor treatment for 6 weeks while the other group was assigned to various 30- and 40-seat classrooms. After 6 weeks the two groups changed places. Students were given a couple days of free choice and then asked to choose a permanent room. There were 106 (63.8 percent) that chose the Eidophor large-screen system and 60 (36.2 percent) chose the regular ITV classrooms. A few days later students indicated reasons for their choice. The four reasons most frequently mentioned for choosing the auditorium (large screen) were that the seats were more comfortable, the location was more convenient, it was easier to see, and the image was large. The four reasons most frequently mentioned for the small ITV classrooms were that the auditorium was conducive to sleep, it was easier to take notes on desks than on lapboards, the lighting was poorer in the auditorium, and the location of the classroom was more convenient.

Zoology

The 180 students selected from 500 zoology students were divided into two groups, either the large screen or the large classroom with six 24-inch TV receivers. After 6 weeks the groups changed places. After 12 weeks students were asked to write which location they would prefer the remaining four weeks. Of these, 133 (77 percent) chose the large screen and 40 (23 percent) chose the large classroom with 24-inch receivers. Students were assigned to the location on the basis of overt preferences. Students were then given a questionnaire including a list of suggested factors that might have influenced their choice, and asked to respond to each one on a four-point scale. The most important factors included: TV screen easier to watch; TV screen size more desirable; blackboard, pictures, easier to see; models and demonstrations easier to see; and seats more desirable.

Accounting

Of the students who had taken accounting a full semester by the large screen, 89 percent thought the picture quality was as good or better than regular TV receivers; 85 percent indicated they would attend another large screen ITV course.

104. GROPPER, GEORGE L., and ARTHUR A. LUMSDAINE. An experimental comparison of a conventional TV lesson with a programmed TV lesson requiring active student response. *Studies in Televised Instruction,* Report No. 2. USOE Project No. 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Stations WQED–WQEX and American Institute for Research, March 1961. *Audio-Visual Communication Review* 9 (1961), A–50–51. (Abstract).

Problem: Determine the relative effectiveness of a conventional ITV lesson with a programed ITV lesson requiring active student response.

Sample: 140 (heat) and 158 (nuclear reaction) junior high school students around Pittsburgh.

Subjects taught: Heat and nuclear reaction.

Key variables: Programed and conventional ITV presentations; learning, retention, ability.

Lessons on heat and nuclear reaction were presented on ITV by both conventional presentation and by programed presentation. The ITV teacher in the programed presentation paused to allow students time to write down their response. Also during the pause a question mark appeared on the screen. All students took an immediate and delayed (1½–2 weeks) achievement test.

Analysis of variance indicated that for the lesson on heat, the programed ITV group had significantly higher scores than the conventional ITV group. High-ability students in the programed group had significantly higher scores than high-ability students in the conventional group for both immediate and delayed posttests. There were no significant differences in the scores of low-ability students between the two groups on the immediate posttest, but conventional students had significantly higher scores on the delayed posttest than the programed group. For the nuclear reaction lesson, two of the five comparisons made were significantly in favor of the programed group.

105. GROPPER, GEORGE L., and ARTHUR A. LUMSDAINE. An experimental evaluation of the contribution of sequencing, pretesting, and active student responses to the effectiveness of "Programmed" TV instruction. *Studies in Televised Instruc-*

tion, Report No. 3. USOE Project No. 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Stations WQED–WQEX and American Institute for Research, April 1961. *Audio-Visual Communication Review* 9 (1961), A–51–52. (Abstract).

Problem: Determine the relative effectiveness of programed ITV made by sequencing, pretesting, and active student response.

Sample: Between 150–186 junior high school Pennsylvania students from four schools.

Subjects taught: Laws of motion, how movies work and levers.

Key variables: Sequencing, pretesting and active student response; learning, retention.

Three experiments were accomplished. For the first, an ITV lesson on laws of motion was shown in two versions. One group saw a conventional ITV version; the other saw a version where the lecturer stopped and invited students to complete what he was going to say and participate further.

Analysis of variance indicated no significant differences between groups on immediate or delayed posttest scores.

For the second experiment, an ITV lesson on how movies work was shown in two versions. One group saw a version which required active response and the lecturer supplied the correct answer after the student response. The other group saw the same lesson, but without active participation.

Analysis of variance indicated that the active response students had significantly higher achievement scores on both the immediate and delayed posttests than the passive group.

For the third experiment, an ITV lesson on levers was shown in three versions. A preview programed version, a version revised after a tryout with three students, and a version twice revised. The latter two versions were compared. The *t*-tests indicated that students seeing the second version had significantly higher scores than those seeing the first, but there were no significant differences on retention scores.

106. **Gropper, George L., and Arthur A. Lumsdaine.** An investigation of the role of selected variables in programmed TV instruction. *Studies in Televised Instruction, Report No. 4.* USOE Project No. 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Stations WQED–WQEX and American Institute for Research, April 1961. *Audio-Visual Communication Review* 9 (1961), A–52–53. (Abstract).

Problem: Determine the relative effectiveness of ITV with student competition, intermittent feedback of knowledge of results, active vs. reading responses, and active responses vs. listening.

Sample: 150–224 seventh- and eighth-grade students in four to six classes in Pennsylvania.

Subjects taught: Airplanes, satellites, body chemistry, and chemistry.

Key variables: Student competition, intermittent feedback; active, reading, and listening responses; learning.

Four experiments were prepared with programed (sequenced and pretested) lessons. For the first, some students viewed a lesson on airplanes requiring active student responses and competition with in-studio students, whereas control students merely viewed the lesson. For the second, some students viewed a lesson on satellites requiring active response and received intermittent knowledge of correct results, whereas control students merely viewed the lesson. For the third, some students viewed a lesson on body chemistry requiring the students to complete responses on a worksheet, whereas control students viewed the lesson having a completed worksheet before them, and the instructor read the sentences twice. For the fourth, some students viewed a lesson on chemistry requiring active responses while a question mark appeared on the screen as the teacher paused, whereas control students viewed a version with no pause, but a triangle appeared on the screen at the same points.

Analysis of variance indicated no significant differences between scores of any of the groups on the four experiments.

107. **Gropper, George L., Arthur A. Lumsdaine, and Virginia Shipman.** *Improvement of televised instruction based*

on student responses to achievement tests. USOE Project No. 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Stations WQED–WQEX and American Institute for Research, March 1961. *Audio-Visual Communication Review* 9 (1961), A–48–49. (Abstract).

Problem: Determine improvement in an ITV lesson by utilizing test results.

Sample: 30–40 junior high school students for each lesson.

Subjects taught: Heat and introduction to chemistry.

Key variables: Preview and revised lessons, learning.

Two lessons on heat and introduction to chemistry were shown to junior high school students. Students then took an achievement instrument.

An analysis of the instrument was made to determine what points had been poorly learned, and the lecture was revised accordingly. Later, both the preview and revised versions were broadcast.

The *t*-tests (using number of intact classes rather than number of students) indicated that students watching the revised version had significantly higher posttest scores than those watching the preview lesson. Students' scores on the demonstration parts of the revised lecture were significantly higher than students' scores of the demonstration parts of the preview lecture, but scores on the demonstration parts were generally lower than the overall scores.

The authors concluded that preview testing is a satisfactory substitute for classroom interaction between teacher and student.

108. **Gropper, George L.**, and others. An evaluation of television procedures designed to stimulate extracurricular science activities. *Studies in Televised Instruction, Report No. 6.* USOE Project No. 336. Pittsburgh: Metropolitan Pittsburgh Educational Television Stations WQED–WQEX and American Institute for Research, May 1961. *Audio-Visual Communication Review* 9 (1961), A–54–55. (Abstract).

Problem: Determine the relative effectiveness of three procedures to motivate students to do certain experiments on their own.

Sample: Seventh- and eighth-grade Pennsylvania students.

Subject taught: Physical science experiment demonstrations.

Key variables: Student and adult demonstrations; providing kits, postcards, or nothing; interest, performance.

The control group watched an adult demonstrator do the six physical science demonstrations, and the experimental group watched a student do the demonstrations. In the latter condition, three of the six demonstrations were completely done and three were only partially done. After the telecast students were asked which demonstration they would like to try at home. One-third were given a kit for the demonstration of their choice, one-third were given post cards to mail for their kit, and one-third were told if they mailed a post card (of their own) they would get a kit. All students filled in a pre- and post-science interest questionnaire, as well as a third questionnaire two weeks later (to see if they had done the demonstration or not).

Analysis of variance and chi square indicated that girls watching the adult demonstrator had a significantly higher increase in science interest scores than girls watching the student (peer) demonstrator. There were no significant differences between boys for adult or student demonstrations. Significantly more students did the demonstration at home after seeing the student performance than the adult. Students receiving kits or post cards had a significantly higher increase in science interest; students not receiving post cards had no significant difference between pre- and posttest in science interest. Of those students receiving no kit, significantly more reported performing the demonstration at home after seeing the student demonstration than the adult.

109. **Grosslight, J. H.**, and **Charles J. McIntyre.** Exploratory studies in the use of pictures and sound in teaching foreign language vocabulary. Technical Report SDC 269–7–53. *Instructional Film Research Reports.* Port Washington, Long

Island, N. Y.: U. S. Naval Special Devices Center, 1955.

See Summary No. 150.

Problem: Determine the relative effectiveness in retention of English-Russian noun and verb pairs with different presentations.

Sample: 947 college students.

Subject taught: Russian language.

Key variables: Words alone, words with still pictures, words with silent motion pictures, words with sound motion pictures, sound motion pictures with student participation, random order, serial presentation.

This is the combined report of a study by Kale (*q.v.*) and modification of procedure by present authors in a second study.

Students were taught Russian language by combinations of variables to determine most effective presentation. This study involved only the recognition of the Russian words, not their correct pronunciation.

Results

1. *Pictures plus titles v. titles only.*—In first study motion pictures plus titles were significantly more effective than titles alone. There was no significant difference in learning between still pictures with titles and titles alone. In second study both motion and still pictures with titles resulted in greater learning than titles alone. Having pictures with a word results in greater learning.

2. *Motion v. still pictures.*—No significant difference in learning from still or motion pictures. Study one intimated that motion pictures were particularly advantageous.

3. *Sound v. silent.*—Sound interfered with learning, at worst, and at best did not enhance it. Pronunciation was not related to spelling and therefore confused spelling.

4. *Participation v. no participation.*—Participation in the form of pronouncing the Russian words as they were spelled inhibited learning. See No. 3 above.

5. *Random v. serial order.*—Groups learning words in random order learned less than groups learning words in serial order. Suggested that serial group was learning by association with previous words in wordlists. When tested for recall, the serial order group had forgotten more words, but had also remembered more words than random order group.

6. *Male v. female.*—Women learned more, forgot less, and relearned more than men. Differences were not always significant, but there were no reverses to this trend.

Conclusions.—For teaching Russian vocabulary, it was recommended that use be made of visual aids in the form of pictures, these pictures need not be motion pictures, a narrator pronouncing words when spelling words will inhibit learning, and films are a convenient method of repetitive presentation of new words.

110. HAGERSTOWN: THE BOARD OF EDUCATION. *Closed-circuit television: Teaching in Washington County 1958–59.* March 1959.

Problem: Determine students' and teachers' attitudes to ITV.

Sample: See below.

Key variables: Students' and teachers' attitudes, sociometric choice, discussion patterns; ITV and face-to-face presentation.

A total of 2,567 students in grades 3 through 12 were chosen at random and given an anonymous 50-item questionnaire about their feelings toward ITV. The students accepted ITV. Only 5 percent indicated they never had their questions answered; 87 percent indicated that the followup discussion was of great benefit. Fifty-eight percent of the students thought they learned more from ITV than from face-to-face presentations. Two-thirds of the students thought that an ITV course would be more interesting and that they would have to pay closer attention in a television classroom. Sixty percent indicated they studied more for ITV classes. Students were about evenly divided on whether they talked with their parents more frequently, read more library books, or participated more in class discussions in ITV classes than in face-to-face classes.

Sixth- and eighth-grade ITV and face-to-face classes took a sociometric instrument. Analysis of ITV students' choices revealed fewer "isolates."

The number of comments made by sixth- and eighth-grade ITV and face-to-face students was counted, along with the type, frequency, and direction of participation.

Student participation in ITV classes seemed to be different from participation in face-to-face classes. Students responded to the ITV teacher and then projected or transferred their discussion to other students in the classroom.

A total of 520 families were interviewed about their reaction to ITV. Seventy-eight percent of the parents were favorable to ITV, 54 percent thought it would give children a better education, and 49 percent preferred that their children take ITV lessons instead of face-to-face lessons (21 percent gave no answer or didn't know). Business and industrial leaders were favorable to ITV.

Teachers responded favorably to ITV in an anonymous questionnaire; 83 percent indicated they would prefer to teach their present class with ITV, and thought ITV could improve the quality of instruction.

Gain scores on standardized tests of ITV students in various grades tended to be greater than gain scores of face-to-face students in the same grade.

111. HALL, JOE. "Educational Television Project, Third Year, 1959–60." Miami, Florida: Dade County (Greater Miami) Public Schools. July 1960. NAEB Research Fact Sheet, Series I, 103, *NAEB Journal* 21 (November 1962), 1–2 (Abstract).

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 30,000 elementary and secondary school students.

Subjects taught: Spanish, art, music, science, literature, safety, history, civics, English, biology.

Key variables: TV teaching, face-to-face teaching.

The analysis of achievement tests when final test scores were adjusted relative to pretest performance indicates that there is no significant difference in results in the elementary schools or between the television method of instruction and face-to-face instruction in the secondary schools. Adjusted raw score differences favor face-to-face teaching in the elementary schools and are almost equally divided between TV and face-to-face taught groups in the secondary schools, but the differences were not statistically significant.

The author concludes that there is no loss in achievement of pupils through instruction by large-group televised instruction.

112. HANDLEMAN, STANLEY D. "A comparative study of teacher attitudes toward teaching by closed-circuit television." *Dissertation Abstracts* 21 (1960), 1289.

Problem: Compare attitudes of two groups of college teachers toward using television in college teaching.

Sample: 136 teachers from 24 colleges and universities representing major geographical sections.

Key variables: Experience using television; attitudes.

Ten questionnaires were sent to each of 40 colleges and universities having closed-circuit television. They were sent to the television coordinator of each school with directions for distribution and matching. Teachers were to be matched by age, sex, teaching experience, subject taught, and specific personality traits. Questionnaires were returned by 24 schools. Each questionnaire was a 40-item Likert instrument concerning the use of closed-circuit instructional television.

Teachers who had taught by television had a significantly higher attitude toward ITV than had teachers who had not taught by television. A significantly positive relationship existed between length of time of television teaching and strength of positive attitude.

Seventeen of the 40 statements used in the questionnaire differentiated the two groups. These included the fear of standardized mechanized education, fear of the non-television teacher decreasing in significance, lack of student feedback, and a distrust of measuring instruments used by researchers.

113. HARBY, S. F. Evaluation of a procedure for using daylight projection film loops in teaching skills. Technical Report SDC 269-7-25. Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1952. *Audio-Visual Com-*

munication Review 1 (1953), 291–292. (Abstract).

Problem: Determine the relative effectiveness of film loops with face-to-face demonstrations.

Sample: Four physical education classes.

Subject taught: Tumbling.

Key variables: Filmed and face-to-face demonstration, films interspersed with practice and massed showings, and required viewing and free choice.

Two-minute sound films of each of eight tumbling demonstrations were prepared.

It was concluded that a filmed demonstration is at least as effective as a face-to-face demonstration, that demonstrations interspersed with practice might be more effective than massed showings, and regulated interspersion of movie demonstrations and practice might be more effective than the student having a choice to view or not. A fair level of proficiency can be taught with the films alone.

114. HARD, GUSTAV C., and DONALD P. WATSON. "Testing scientific terminology on television." *Science Education* 39 (1955), 140–141.

Problem: Assimilation of subject matter in a given time in TV presentations.

Sample: Three matched groups of randomly selected college students.

Subject taught: Scientific terminology.

Key variables: Learning, retention, number of terms presented.

Three matched groups of randomly selected college students viewed kinescopes of a TV lesson with varying numbers of scientific terms in each version. Version I had 15 scientific terms in 15 minutes, Version II had 20 terms in 19 minutes, and Version III had 25 terms in 24 minutes.

Students in each group saw only one version. After seeing the film, each group was asked to write down all the terms they could remember from the film, and then were given a comprehensive test of matching the terms with definitions.

Results.—Using analysis of variance to interpret data, the authors found that (1) increasing the number of items in the specified time limits did not alter significantly the number of terms recalled or comprehended, (2) the group with the exposure to the most terms learned the most, but no study was made of the optimum number of scientific terms presented in a given time limit.

115. HARDAWAY, CHARLES W., C. LAWRENCE BEYMER, and WILLIAM E. ENGBRETSON. *A study of attitudinal changes of teachers and pupils of various groups toward educational television.* USOE Project No. 988. Terre Haute: Indiana State College, June 1963. (Mimeographed).

Problem: Determine attitudes of pupils and teachers toward ITV.

Sample: 1,633 elementary pupils, 1,487 secondary pupils, and 401 teachers in Indiana and Illinois.

Subjects taught: Various Midwest Program on Airborne Television Instruction (MPATI) courses.

Key. variables: Attitudes, attitudes over time, and ability level.

Three Likert attitude scales were constructed: an elementary, a secondary, and a teacher form of 26, 34, and 42 items respectively. Judges determined that the scales had content validity in four areas: curricula content, instructional effectiveness, role of teacher, and role of the pupil. ITV course grade and IQ level were available for all pupils. The attitude scales were taken before and after a school year.

The *t*-tests indicated no significant differences between elementary pupils' pre- and post-attitude scores. The combined third and fourth grades had a significantly higher attitude score than the fifth grade. Low-ability fourth-grade pupils had significantly higher attitude posttest scores than high-ability pupils, and high-ability fifth-graders had significantly higher attitude posttest scores than low-ability pupils. Fifth-grade pupils who received low grades had significantly higher scores than those receiving high grades. This finding was reversed for sixth-grade pupils. There were no significant differences between sexes on posttest means of any pupils.

Secondary level pupils had significantly lower posttest scores than pretest scores. Posttest mean scores of secondary pupils who had foreign languages by ITV were significantly higher than pupils having social studies, who in turn had significantly higher scores than pupils having secondary science. There were no significant differences between posttest mean scores of high- and low-ability secondary pupils.

There were no significant differences in attitude scores of elementary schoolteachers between pre- and posttests. Secondary schoolteachers shifted toward significantly lower attitude scores on the posttest. There were no significant differences between scores of teachers who utilized MPATI classes and those who didn't, but teachers who had utilized MPATI courses and had completed a course or workshop in MPATI utilization had significantly higher posttest scores than teachers who had not utilized MPATI courses and who had not attended a course or workshop. Teachers who were rated average or below by their respective administrators had more favorable attitudes toward educational television than did those teachers who were rated above average by their administrators.

116. HARRIS, CHARLES O., and others. *Development of problem solving ability and learning of relevant-irrelevant information through film and TV versions of a strength of materials testing laboratory.* USOE Grant No. 7-20-040-00. East Lansing: College of Engineering, Michigan State University, Nov. 5, 1962. (Offset).

Problem: Determine the relative effectiveness of learning from four presentation methods.

Sample: 150 students at Michigan State University.

Subject taught: Strength of materials.

Key variables: Kinescope, color film, color film and lab, lab only presentations; learning; relevant and irrelevant material.

Fourteen color films from 14 to 29 minutes long were especially produced on various topics. Students had either the conventional laboratory treatment, the lab and films, films only, or the films shown on TV (and rendered black and white) treatment. Students in all treatment conditions took 20-minute achievement tests after each film (or demonstration). Item analysis eliminated items answered correctly by fewer than 10 percent or greater than 90 percent of the students, and all items having an r_{bis} of $< .40$ with the total score.

A significant interaction was found for test scores on relevant material between groups and topics. The predicted hypothesis that mass communication media would be more effective by screening out irrelevant material was partially supported.

The second-year students took 10 problem-solving questions (each question had an r_{bis} $> .57$ with the total score). Students in the film and lab group had significantly higher scores (.05 level) than film-only or lab-only groups. There was no significant difference between film-only and lab-only groups.

117. HARRIS, CHESTER W., and LOUISE R. BUENGER. "Relation between learning by film and learning by lecture." *Audio-Visual Communication Review* 3 (1955), 29-34.

Problem: Determine the relation between learning by lecture and by film.

Sample: Students in history at the University of Wisconsin.

Subject taught: History.

Key variables: Lecture and film presentation, review of film, measurement of learning by objective and essay tests.

Students in classes (no random assignment) were given part of a unit on medieval history by lecture and part by two 10-minute British films. At the time of the 6-weeks examination, students received a short, 15-item objective test (K-R #20 $r = .63$) on the special lecture unit, a short objective (K-R #20 $r = .57$) test on the film material, plus a traditional essay test (45 minutes). Correlation of the two objective tests with each other was .06, of the objective lecture test with the essay test .48, and of the objective film test with the essay test .12.

The authors then ran a second experiment, allowing students to review film material. Reliabilities of the two objective tests were about .36

(film) and .48 (lecture). Correlation of the film test with the lecture test was about .24, and correlation of the film test with the essay test was about .20.

From the explanations that could be offered, the authors felt that opportunity to review, which the lecture group had that the film group presumably did not have, might explain partly the observed differences.

118. Hartman, Frank R. "Filmed lectures as supplementary and refresher education." *Audio-Visual Communication Review* 8 (1960), 214–219.

Problem: Determine students' attitudes and learning from supplementary films.

Sample: 155 Penn State students.

Subject taught: Harvey White *Introductory Physics* mechanics and electricity and magnetism (E&M) films.

Key variables: Mechanics and E&M films; learning, and attitudes.

Students were divided into two groups: one group saw E&M films and the other saw mechanics films from the Harvey White series. All students took the CEEB physics test as a pretest. After the 11-week series, each group took a 50-item examination having two parts: one part on E&M and another on mechanics. After the examination all students took a questionnaire on the value of the films.

An analysis of covariance run on students' scores on the mechanics part of the final examination, controlling for College Entrance Examination Board (CEEB) physics pretest scores, indicated that the students viewing the mechanics films had significantly higher (.01 level) scores than the E&M students. An analysis of covariance run on students' scores on the E&M part of the examination, controlling for CEEB physics pretest scores, indicated that students viewing the E&M films had significantly higher scores (.01 level) than the mechanics students.

Students regarded the films as helpful in understanding physics, and 66 percent indicated they would like to see Penn State University have a physics course "based on these films."

In another experiment, students attending engineering classes were invited to attend evening showings of the mechanics film series. About 10 percent ($N=34$) attended the first showing and about 5 percent ($N=15$) attended the second showing. Only three students attended the fifth viewing. Students who attended were neutral or slightly favorable toward the value of the films.

119. Hartman, Frank R. Investigations of recognition learning under multiple channel presentation and testing conditions. In *Research on the communication process: A report covering the period September 1958–September 1960.* University Park: The Pennsylvania State University, October 1960. p. 5–1 to 5–26. (Offset).

Problem: Determine the relative effectiveness of additional channels to increase learning, and the effectiveness of redundant information.

Sample: 1,184 freshmen at Pennsylvania State University.

Subject taught: A film having 5-second presentations of 25 people looking up and smiling while their name appeared on the screen and an announcer read the name.

Key variables: Audio, print, pictorial, pictorial and audio, pictorial and print, audio and print, and audio and print and pictorial treatments and testing conditions; learning.

Students saw the film presented on television sets. Seven channel combinations were achieved by omitting the audio, omitting the video, or blocking out the filmed person, or blocking out the filmed person's name. After viewing (or hearing) the film, each group watched a film having 5-second presentations of 75 people and attempted to identify which 25 of the 75 they had watched previously. Students then filled out a questionnaire.

Experiment I

The following shows the seven different ways the 25 person film was presented and three of the different ways the groups saw the 75 person testing film, the number indicating the number of subjects in that treatment.

	Audio	*Print*	*Pictorial*	*Audio and print*	*Audio and pictorial*	*Print and pictorial*	*Audio and print and pictorial*
Print	23	23	0	22	24	22	23
Audio	23	23	0	23	23	22	25
Pictorial	0	0	22	0	22	22	22

Analysis of variance and *t*-tests indicated that for the groups tested by the audio channel, the audio-and-print group had significantly more correct discriminations than both the pictorial-and-print, and pictorial-and-audio groups (.05 and .01 levels); the pictorial-and-audio group also had significantly fewer correct discriminations than the audio, print, or audio-and-pictorial-and-print groups.

For the groups tested on the print channel, the group who had received the initial treatment by print had significantly higher discrimination scores than any other group except the print-and-audio group; the print-and-audio group in turn had significantly higher scores than all other groups, and the pictorial-and-audio group had significantly lower scores than any of the other groups.

For the groups tested on the pictorial channel, analyses of variance indicated no significant differences in discrimination scores for any of the (four) groups.

It was concluded that the addition of the pictorial channel resulted in fewer correct discriminations, and that interference occurred in the three channel presentation groups. The interference between names and faces was unexpected, and the author suggests that attention was divided and learning in both channels was reduced.

Experiment II

Additional students in each of the seven treatments (*N* about 34 in each treatment) were tested by an audio-and-print-and-pictorial combination.

Analysis of variance indicated significant (.01 level) differences among the means of the seven treatment groups. The *t*-tests indicated that the audio-and-pictorial-and-print group had significantly higher discrimination scores than any other group except the audio-and-print group; the audio-and-print group in turn had significantly higher scores than any of the remaining groups except the print group, and the pictorial group had significantly lower scores (.01 level) than any of the groups.

The author concludes that in the audio-and-pictorial-and-print testing condition, the addition of the pictorial channel to the verbal channels produces an advantage over two of the verbal channels, audio-and-print, and audio, but not over print.

Experiment III

Additional students in each of the seven treatments (*N* about 30 in each treatment) were tested by (1) audio-and-print, (2) audio-and-pictorial, and (3) print-and-pictorial conditions.

Analyses of variance indicated significant (.01 level) differences among the means of the seven treatment groups for each of the three testing conditions.

For the groups tested on the audio-and-print channel, *t*-tests indicated that the audio-and-print group had significantly higher discrimination scores than any other group except the print group, and that both the print and the audio groups had significantly higher scores than both the audio-and-pictorial-and-print, and the audio-and-pictorial groups.

For the groups tested on the audio-and-pictorial channel, *t*-tests indicated that the pictorial group had significantly lower scores than any other group.

For the groups tested on the print-and-pictorial channel, *t*-tests indicated that the audio-and-print group had significantly higher scores than all other groups except the audio-and-pictorial-and-print group; the audio-and-pictorial-and-print group had significantly higher scores than the pictorial-and-audio, the audio, and the pictorial groups, and that the pictorial group had significantly lower scores than any other group.

120. HAYMAN, JOHN LUTHER, JR. "A comparison of three presentation methods

in educational television." *Dissertation Abstracts* 22 (1962), 3678–3679.

Problem: Determine the relative effectiveness in learning Spanish on ITV by direct lecture, lecture plus student response, and lecture with a pupil panel plus student response.

Sample: 608 fifth-grade pupils from 24 Denver schools.

Subject taught: First-year Spanish (aural—oral; no reading or writing).

Key variables: Direct lecture, direct lecture plus student response, lecture with a pupil panel in the studio plus student response, learning.

Two 15-minute telecasts were videotaped for each of the three presentation methods. In the direct lecture method, the teacher taught directly to the camera. In the lecture plus student response method, the teacher asked students to respond. In the third method the ITV teacher talked with and got a verbal response from some pupils in the studio, and classroom pupils were also asked to respond. All pupils received a 20-item (split-half $r=.84$) listening comprehension instrument administered on television. Eight of the items were specifically practiced during the lecture; 12 were not. A negatively skewed distribution necessitated using a transformation technique to obtain a normal curve (McCall's T scaling). IQ, grade average, and California Achievement scores in reading vocabulary and English mechanics were used as control variables.

Analysis of covariance showed a "significant" (.075 level) F ratio among students in the three presentation methods. Students receiving the pupils-in-studio-and-recitation method had significantly (.057 level) higher scores than those in the second method.

Group rank differences were significantly larger between groups receiving the second and third methods (.01 level) and tended to be larger (.12 level) between groups receiving the first and second methods. Scores on rehearsed items were significantly higher than on unrehearsed items for groups in all three presentations.

There were no significant interactions.

121. **Hayman, John Luther, Jr.** "Viewer location and learning in instructional television." *Audio-Visual Communication Review* 11 (1963), 27–31.

Problem: Determine learning from ITV.

Sample: 577 fourth-grade pupils from 24 Denver schools.

Subject taught: Spanish.

Key variables: Pronunciation, learning, location in viewing room.

All pupils saw three 15-minute ITV lessons and took a 35-item listening comprehension test after the third lesson. The average biserial correlation of items with the total score was .40 and split half $r=.72$. The second test was a speaking test involving repeating words heard and oral identification of articles in Spanish. Seventy pupils took the second test.

Analyses of covariance were run controlling on IQ, grade point average, and Stanford Achievement Test paragraph meaning scores. There were no significant differences on the test of listening comprehension among scores of pupils sitting in the center portion, the far back portion, or the sides of the viewing room. On the speaking test, pupils in the center and in the back made significantly higher scores (.05 level) than pupils in the sides. Those on the sides were at an angle of more than 40 degrees from the center of the TV screen.

122. **Hayman, John Luther, Jr.** The Denver-Stanford project — increasing ITV's effectiveness through contextual activities. Paper presented at the conference on The Improvement of Teaching by Television and Radio, University of Missouri, Columbia, March 2, 1964. (Typewritten). (See also Andrade, Manuel, John L. Hayman, Jr., and James T. Johnson, Jr. "Measurement of listening comprehension in elementary-school Spanish instruction." *The Elementary School Journal* 45 (1963), 84–93; Barcus, Delbert, John L. Hayman, Jr., and James T. Johnson, Jr. "Programing instruction in elementary Spanish." *Phi Delta Kappan* 44 (1963), 269–272; Hayman, John L., Jr., and James T. Johnson, Jr. "Exact vs.

varied repetition in educational television." *Audio-Visual Communication Review* 11 (1963), 96–103; Hayman, John L., Jr., and James T. Johnson, Jr. "Parents help educate their children through instructional television." *The Journal of Experimental Education* 32 (1963), 175–180; Hayman, John L., Jr., and James T. Johnson, Jr. "Research on the context of instructional television." *School Life* 45 (1963), 8–11; and Hayman, John L., Jr. "Viewer location and learning in instructional television." *Audio-Visual Communication Review* 11 (1963), 27–31.)

Problem: Determine the relative effectiveness of combinations of ITV with different types of classroom and home activities.

Sample: 13,000 Denver fifth- and sixth-graders in 90 schools.

Subject taught: Spanish.

Key variables: Frequency of instruction by television; face-to-face and programed instruction; electronic aids (tape recorders), home practice, teacher interest and motivation, and pupils' learning.

Fifth-grade pupils watched 15-minute ITV lessons three times a week, and sixth-grade pupils watched 15-minute ITV lessons twice a week. All pupils had a 15-minute face-to-face follow-up after each ITV lesson. Sixth-graders had an additional 30 minutes of face-to-face instruction (not preceded by ITV) each week. Fifth-grade instruction involved only listening and speaking; this audio-lingual instruction continued for the sixth grade, and reading and writing were introduced.

The first year of research involved only fifth-grade pupils. One group watched television only, other groups had different types of additional instruction, and a final group watched each ITV lesson twice.

The second year of research, fifth-grade pupils listened to records or tape recorders. Sixth-graders were divided into two groups: each watched the two ITV lessons a week, but one group had reading and writing instruction introduced the first semester whereas the other group had reading and writing introduced the second semester. Pupils had reading and writing either by face-to-face or programed instruction methods.

The third year, fifth-graders were divided into three groups: without additional electronic aids, electronic aids without feedback, and with feedback (could record and play back their own voices). Reading and writing combinations included teacher-directed instruction plus programed instruction in school, teacher-directed instruction in school and programed instruction at home, and these methods plus extended reading at home and at school.

Analysis of covariance was the primary statistical technique used.

Following are some of the major conclusions of the study. A second viewing was valuable when the pupils had no additional instruction; when other instruction was provided, the second viewing was less effective. Classroom practice consisting of structure, dialog, and narrative drills proved most effective. Electronic aids, especially those with feedback, were most effective, notably when teachers had moderate experience and preparation. Reading and writing should start at least by the beginning of the second year of instruction. Supplemental activities which provided more variety produced more learning. A well-trained and motivated classroom teacher was the most effective single learning aid. Both the interest and experience of the classroom teacher influenced learning. Where teacher interest was high, pupil performance was directly related to teacher preparation and experience. Where teacher interest was low, pupil performance was inversely related to teacher preparation and experience. If not begun too early, programed instruction was as effective as face-to-face teaching; a combination of programed instruction and face-to-face instruction was still more effective. Children whose parents participated in the program learned more Spanish than those whose parents did not participate. There was a low correlation between amount of practice at home and pupil performance. There was a higher correlation between performance and the number of weeks participation continued.

123. HAYMAN, JOHN LUTHER, JR., and JAMES T. JOHNSON, JR. "Exact vs. varied repetition in educational television." *Audio-Visual Communication Review* 11 (1963), 96–103.

Problem: Determine learning by a second viewing of ITV.

Sample: 6,000 pupils in 192 Denver schools.

Subject taught: Spanish.

Key variables: Number of viewings per lesson, kinds and mode of repetition, learning, speaking, and teacher training.

In the first semester, all pupils were divided into three groups. All received Spanish by television. The second group received in addition a 15-minute teacher-directed follow-up. The third group did not have the follow-up but saw the program again that evening.

In the second semester, the ITV-only group's treatment changed so that they got both the follow-up and the second viewing. The second viewing constituted the exact repetition and the teacher-directed follow-up constituted the varied repetition condition.

Pupils took a listening comprehension test (split-half $r=.89$) and an oral test.

Analysis of covariance technique controlled for IQ, grade point average, and Stanford Achievement Test paragraph meaning scores. Listening comprehension scores of first semester pupils in the teacher-directed follow-up group were significantly higher than those pupils seeing each program twice, which in turn were significantly higher than those of pupils in the nonrepetition group (.001 level). Listening comprehension scores of second semester pupils in the teacher-directed group were significantly higher than those of pupils seeing each program twice (.01 level), but there were no significant differences between the teacher-directed group and the second viewing plus teacher-directed group.

A similar experiment was run the following year, in which pupils were assigned either to an ITV plus teacher-directed follow-up or to an ITV plus teacher-directed follow-up plus evening viewing treatment. The evening viewing group achieved significantly higher scores (.02 level) on the oral test than the comparable group without evening viewing. Exact repetition was most effective (as determined by listening comprehension test scores) for teachers with low training and was least effective for teachers with greater training.

124. HEAD, SYDNEY W., and C. LEE PHILIPS. *A field experiment in the summertime use of open-circuit television instruction to bridge the gap between high school and college.* [USOE No. 060.] Coral Gables, Florida: University of Miami, 1961. (Mimeographed).

Problem: Determine the effectiveness of learning by television and students' attitudes toward television.

Sample: 66 students.

Subjects taught: English, logic, and history.

Key variables: Television and face-to-face presentation; learning and attitude.

Thirty-one students took all three ITV courses, 21 took two, and 14 took one ITV course. The 66, as well as a control group of 362, took parallel forms of subject matter tests as pre- and posttests. Students taking history and logic by ITV had significantly higher scores on the ACE than control group students in those classes. Thus, these groups were not equated in ability.

Analysis of covariance, controlling for ACE scores on the pretest showed that for all three classes, television students made significantly higher test scores than did face-to-face students on the subject matter test.

Interviews with students after the second semester indicated that students regarded the summer courses as valuable. Students reported they could see and hear better, for television classes. They reported being less inhibited or distracted than in a large face-to-face class. Students did not believe that lack of "personal contact" was detrimental to learning. "Student-teacher contact seemed to be regarded as personally desirable but not essential to the educational objectives of the courses."

125. HERMINGHAUS, EARL G. "Large group instruction by television: An experiment." *School Review* 65 (1957), 119-133. See also "An investigation of television teaching." *Audio-Visual Communication Review* 5 (1957), 556. (Abstract).

Problem: Comparative effectiveness of television and face-to-face teaching.

Sample: About 1,000 ninth-grade students.

Subjects taught: General science, English composition.

Key variables: Learning, TV teaching, face-to-face teaching, student attitudes.

Students in two high schools were taught subjects by open-circuit television and face-to-face instruction. Students were matched prior to instruction on intelligence, age, and socioeconomic status of father. Achievement test was given as pretest in February before instruction and as posttest in June after instruction. The scores for the students on all matching variables and criteria were:

Test	*TV*	*Face-to-face*	*p*
Greene-Stapp Language abilities test			
Pretest percentile	59	62	NSD
Posttest percentile	78	73	NSD
General Vocabulary (Iowa Test)			
Pretest percentile	66	65	NSD
Posttest percentile	79	78	NSD
Student Compositions			
First (judge's rating)	2.76	2.98	.01
Final (judge's rating)	3.08	3.19	NSD
Read General Science Test			
Pretest percentile	18	17	NSD
Posttest percentile	41	34	.05
Interpreting Reading Materials in Natural Sciences (Iowa Test)			
Pretest percentile	49	49	NSD
Posttest percentile	65	65	NSD

[NSD=No significant difference.]

A significant difference was noted for the general science students that favored the TV group for intelligence and the face-to-face group for age. The authors reported after adjustment for initial ability, age, and socioeconomic status that (1) there was no significant difference between methods of instruction for learning in English composition, and (2) there was no significant difference between methods of instruction for learning in general science.

Students, on the whole, did not react favorably to TV teaching as evidenced by an attitude inventory conducted near the end of the experiment. Two-thirds of the English students and half of the science students taught by TV thought they would have learned more in the face-to-face situation. They also reported they felt the TV instruction was less interesting and they missed personal contact with the teacher. The author concluded that students, by the ninth grade, have come to expect face-to-face contact with a teacher in the instructional situation and felt insecure in the TV teaching situation.

126. HIMMLER, MERWIN LEWIS. "An analysis and evaluation of a television demonstration of the teaching of fifth-grade reading, arithmetic, and French." *Dissertation Abstracts* 17 (1957), 2467.

Problem: Determine pupils' learning from ITV, and teachers' attitudes toward ITV.

Sample: 1351 fifth-grade pupils in 39 classes from the Pittsburgh area.

Subjects taught: Reading, arithmetic, and French.

Key variables: Television and face-to-face presentation; learning and attitudes.

Twenty classes daily received 25-minute ITV lessons in arithmetic and reading, and 20-minute ITV lessons in French. After the televised portion, the reading classes had 25 minutes of face-to-face instruction, the arithmetic classes had 15, and the French classes had 10 minutes of face-to-face instruction. Nineteen other classes served as a control group for reading and arithmetic. All pupils took standardized tests in reading, language skills, work-study skills and arithmetic the third week and at the end of the term. Pupils also took an intelligence test near the beginning and a teacher-made French test at the end of the term. Finally, pupils and teachers filled out questionnaires.

Achievement was compared by matching pairs. From 655 ITV pupils and 666 non-ITV pupils, 343 matched pairs were selected for reading, 349 were selected for arithmetic, 139 pairs for language skills, and 161 pairs for work-study skills comparisons.

There were no significant differences in scores of pupils in the ITV and non-ITV groups on the standardized tests. It was concluded that pupil interest will likely be high if the lessons have variety, if they are appropriately paced, and if they allow for student participation. Many teachers emphasized the importance of the supplementary sessions following the ITV lessons, and were not favorable to having regular ITV lessons. Reading was considered more suitable than French or arithmetic for ITV teaching.

127. HIRSCH, RICHARD S. "The effect of knowledge of results on learning of meaningful material." *Abstracts of Dissertations,* Vol. 27. Stanford, Calif.: Stanford University, 1953. p. 31–33.

Problem: Determine if knowledge of results affects retention of material learned from tests based on the contents of selected sound films.

Sample: 138 men in six groups of 23.

Subject taught: Naval training.

Key variables: Learning under various conditions: (1) correct answers rewarded with a lighted lamp, (2) the number of the correct answer appearing, (3) the question plus the right answer appearing on the screen, (4) film reshown with the question and correct answer, (5) test taken after the film without knowledge of the results, (6) film reshown after the test was taken (without knowledge of the results).

All subjects took a pretest over the content of the six films. Several days later, subjects saw the films, took a test immediately after the film, and learned (or did not learn) of their test results by one of the six methods indicated above. Each group saw all the films under all of the experimental conditions (knowledge of test results). Finally, all subjects took a delayed posttest on all the films.

Analysis of variance and *t*-tests indicated that the most effective method—and significantly so—was repeating the question and its answer, and, after the test, showing the film a second time (number 4 above). A repeat screening not only decreased forgetting but also made possible new learning. The second most effective method was repeating the question and its answer (but not showing the film a second time). These two methods had no significant loss in retention scores over the time tested. The third most effective method was showing the film twice but without knowledge of results. A significant amount of forgetting occurred with this method. Methods ranking fourth and fifth were the indication of response correctness by a lamp or answer number, and least effective was the method offering no knowledge of results.

Additional sources: Hirsch, Richard S. "Effects of knowledge of test results on the learning of meaningful material." Doctoral dissertation, Stanford University, 1951.

Also found in: *Instructional Film Research Reports.* Technical Report SDC 269-7-30. Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1952.

128. HOMMAN, GUY BURGER. "A study of several factors and their relationships to achievement in high school chemistry by use of factorial design and covariance." *Dissertation Abstracts* 22 (1962), 3949.

Problem: Determine the relative effectiveness of film and nonfilm instruction on achievement.

Sample: 590 high school students.

Subject taught: Chemistry.

Key variables: Film and face-to-face presentation; sex, science or nonscience career goals, and learning.

All students took the Anderson Chemistry Test and the American Chemical Society-National Science Teachers Association Cooperative Examination (ACS-NSTA) as pretests and posttests, as well as the School and College Ability Tests.

Eleven of the 20 hypotheses tested indicated that the achievement scores of nonfilm students were significantly higher (.05 and .01 levels) than were the scores of film students. The other nine hypotheses indicated no significant differences. There was a significant interaction between sex and method in two of the five analyses (.05 level). Neither previous science nor mathematics preparation was a significant factor in achievement scores.

129. HOWE, HAROLD B., and GEORGE W. BOGUSLAVSKY. *The development of animated films to facilitate creative space perception.* USOE Project No. 259. Troy, New York: Rensselaer Polytechnic Institute, December 1961.

Problem: Determine the relative effectiveness of three methods of teaching descriptive geometry to engineering students, using different pictorial aids.

Sample: 536 freshman engineering students at Rensselaer.

Subject taught: Descriptive geometry.

Key variables: Textbook, multi-view projection, multi-view projection plus picture, multi-view projection plus picture plus six animated films; learning and attitudes.

Students were divided into three groups. Group one had a text with few pictorial illustrations and had a 50-minute lecture with no accompanying pictorial illustrations. Students were not required to supply pictorial representations as aids in solving problems. Groups two and three had a text which emphasized pictorial forms in space and students were required to use pictorial representations as aids in solving problems. The 50-minute lecture of group two used pictures; the 50-minute lecture of group three used six 20-minute films with each film shown on two different days, and the lecture on film days was only thirty minutes. Questionnaires indicated that a large number of students also referred to additional texts other than those assigned for their group. (Treatment I, 53 percent; treatment II, 18 percent; treatment III, 11 percent.)

Treatment effects were measured by daily laboratory problems, selected from separate workbooks, with several in course similar tests and a final examination.

Chi square and the median test revealed no significant differences among groups. The relation of course performance and ability was closer in group three than the other two groups. Students preferred the text with pictures but preferred the method of lecture and grading of group one.

130. HUDSON, W. "Colour versus monochrome in a demonstration film used to administer performance tests for the classification of African workers." *Journal of National Institute of Personnel Research*, Johannesburg, South Africa, 7 (1958), 128. In *Psychological Abstracts* 33 (1959), 9432. (Abstract).

Problem: Comparative effectiveness of color and black and white films.

Sample: 147 African natives.

Subject taught: Not given.

Key variables: Learning, color film, black and white film.

A film was used to give instructions to 147 African workers representing 10 tribes. Two versions of the film were studied over a 4-month period. The hypothesis that a color demonstration film improves test instructions and consequently improves performance was rejected.

131. HUFFMAN, STANLEY AUSBURN, JR. "A comparative analysis of four instructional methods in eighth grade science." *Dissertation Abstracts* 19 (1959), 2294.

Problem: Determine the relative effectiveness of film, lecture, and demonstration combinations.

Sample: Eighth-grade science students.

Subject taught: Exploratory science.

Key variables: Learning; lecture-description, lecture-film, lecture-demonstration, and lecture-film-demonstration.

Students were randomly assigned to one of the four treatments, and were taught for 4 weeks. Students took a pretest, a posttest, and a delayed posttest 4 weeks after the unit was finished.

The *t*-test indicated no significant differences between any of the treatment groups for any of the three testings.

132. HUNT, LYMAN C., JR. *An experimental project appraising the effectiveness of a program series on reading instruction using open-circuit television.* USOE Project No. 309. University Park: Pennsylvania State University, March 1961. *Audio-Visual Communication Review* 9 (1961), A–47. (Abstract).

Problem: Determine the effectiveness of a television series designed to influence teachers in reading instruction.

Sample: 213 teachers of grades 1–6 in Pennsylvania.

Subject taught: Individual reading instruction.

Key variables: ITV presentation or none, written reports, and attitudes of teachers, parents, and pupils.

Teachers were divided into four groups. Two groups agreed to watch as many of the 15 half-hour reading instruction programs as they could; two groups agreed *not* to watch them. One of the groups in each set of two turned in a written report each week. Teachers completed an attitude questionnaire and a self-report of teaching reading before and after the ITV series. Teachers were also observed and interviewed before and after the series. Some parents also took the attitude questionnaire. Pupils in grades 3, 4, and 5 also took an attitude test.

It was concluded that watching an ITV program of reading instruction significantly affected the observed classroom performance of teachers, and had a significant positive effect on changing teachers' attitudes toward teaching reading. Watching the program had a significant effect on what teachers reported they did and significantly changed attitudes of viewing parents, but had no effect on pupils' reading achievement or attitudes. Writing weekly reports had no significant effect on any of the other variables.

133. HURST, PAUL M., JR. "Learning sets: Kinescope vs. film." *Audio-Visual Communication Review* 3 (1955), 257–273.

Problem: Determine if trainees will learn more from a film if told it is a kinescope, or more from a kinescope if told it is a film.

Sample: 931 men at Bainbridge Naval Training Center.

Key variables: Film and kinescope presentation, calling film kinescope or vice versa, learning.

Three films and three kinescopes were selected. Two groups viewed each film and kinescope. One viewing group was correctly told it was a film (or kinescope); the other group was incorrectly told it was a kinescope (or film). Each film-kinescope group was matched on number of weeks in training and Navy General Classification test scores. Trainees were given a content objective test on each film or kinescope (r varied from .69 to .99 for the six film-kinescopes).

There were no significant differences between the scores of men who were correctly told the presentation medium from the scores of those who were incorrectly told the presentation medium.

134. HURST, PAUL M., JR. Relative effectiveness of verbal introduction to kinescope recordings and training films (20–TV–2). *Instructional TV Research Reports.* Port Washington, Long Island, New York: U. S. Naval Training Devices Center, 1955.

Problem: Replication of 1951 study by Jackson to see if introducing a film as a kinescope recording increased learning.

Sample: 931 recruits at Bainbridge Naval Training Center.

Subjects taught: Atomic defense, manila and wire rope, survival at sea, measuring instruments.

Key variables: Learning from films and kinescopes with varied introductions.

The same films and kinescopes used by Jackson in *Learning from Kinescopes and Films* (*q.v.*) were supplemented by two additional kinescopes and two more films. Six pairs of matched groups, matched on weeks of training and Navy General Classification Test scores, viewed the films. For each of the six kinescopes or films, one of a pair of matched groups received introductory remarks which stated they were to see a kinescope while the other group in the pair received an introduction stating they were going to see a film. Jackson's true-false pretests and posttests were used for the original devices and new multiple-choice examinations were constructed for the new devices. All tests were given in a pretest-posttest design.

No significant differences in learning were found when the test scores for each of the pairs were analyzed by analysis of covariance adjusting for score on the NGCT. The study of two of the materials was repeated because of a possible significant difference in one and the wide variance with the results of the Jackson study in the other. In one of the materials no significant difference was found, but in the other the difference reached the .05 level, but in an opposite direction (favored film introduced as film) from Jackson.

The author concluded that (1) substantial learning took place from both films and kinescopes, (2) that there was no significant difference in learning when film was introduced as a kinescope or a kinescope introduced as film, (3) that instructional effectiveness was not compared because of different contents of the six kinescopes and films, and (4) that the novelty effect noted in the Jackson study may have disappeared in the intervening time period.

135. HUSBAND, RICHARD WELLINGTON. "Television vs. classroom for learning general psychology." *American Psychologist* 9 (1954), 181–183.

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 54 college students at their homes.

Subject taught: General psychology.

Key variables: TV at home, TV in studio, TV recordings (kinescope), face-to-face methods of instruction, learning.

Students were taught general psychology as follows: *TV at home* where they viewed lectures broadcast over open-circuit TV, *in-studio class* seated either in studio with TV teacher while TV lesson was presented or in adjacent room watching monitor, *kinescope* recordings viewed as films followed by a face-to-face discussion, or in two face-to-face classes taught by the TV instructor.

Student learning was measured by grades earned in the course with equivalence of groups controlled by high school grade-point average and ACE median test scores. The results were:

Class	*Mean grade* [1] *in psychology course*	*Mean high school grade point*	*ACE test median (percentile)*
TV-at-home	2.32	[2]2.71	NA
TV-in-studio	2.06	2.85	52
Kinescope	2.50	2.81	52
Face-to-face #1	2.30	2.78	53
Face-to-face #2	2.24	2.89	58

[1] A=4.000. [2] High school grades not available for 14 students. NA: not available.

Article includes a description of the administration of the course.

For followup study see: Benschoter, Reba Patterson, and Don C. Charles. "Retention of classroom and television learning." *Journal of Applied Psychology* 41 (1957), 253–256.

136. INSEL, SHEPARD A., KURT SCHLESINGER, and WILFRED DESROSIERS. "Dependency responses to televised instruction." *Journal of Applied Psychology* 47 (1963), 328–331.

Problem: Comparison of self-dependent and other-dependent attitudes of students taught by television and lecture-discussion methods of instruction.

Sample: 375 college freshmen.

Subjects taught: Biology, psychology, basic communication, and creative arts.

Key variables: Self-dependent and other-dependent student attitudes toward effective and ineffective instruction, television teaching, lecture-discussion teaching.

A total of 375 college freshmen was taught one of the four courses by television during a semester in which the remainder of their instruction was by lecture-discussion methods. After the tenth telecast each student was asked to describe specific and recent incidents which to them exemplified effective and ineffective television instruction, effective and ineffective classroom instruction. Each student responded with an anecdote illustrating each of the four situations.

Four clinical judges examined each of the anecdotes and extracted the critical phrase or phrases from each one according to the Flanagan critical incident technique. These incidents were classed in six subcategories of teacher-initiated behavior, student-initiated behavior, student-teacher interaction, class discussion or interaction, application of course material or method, and physical aspects of the teaching-learning situation. A seventh category of useless was added to collect unclassifiable statements.

After the incidents had been subcategorized, they were classified as belonging to one of two logical groups of self-dependent and other-dependent incidents. Responses for the subcategory student-teacher interaction were removed from this classification to prevent biasing in favor of the lecture-discussion method.

Results.—There were 135 students (35 percent) that responded to effective televised instruction in an other-dependent manner, while at the same time describing effective lecture-discussion instruction in self-dependent terms. This percentage gave a chi square of 90.44 with 9 degrees of freedom which was significant beyond the .001 level. There were no other significant combinations of effective-ineffective instruction incidents for television and lecture-discussion teaching.

Conclusions.—Televised instruction evoked, or was related to, significantly more other-dependent responses than lecture-discussion instruction. The reporting of what is effective and ineffective in a teaching-learning situation which has little opportunity for student to teacher communication requires student identification of external factors in order to derive meaning from the situation.

The authors note the frequency with which other-dependent responses occurred in lecture-discussion teaching situations and state that this may signal a shift in our educational structure to other-dependent attitudes as satisfying and meaningful instead of the individual-dependent attitude usually ascribed to the conventional classroom teaching-learning situation.

137. INSTRUCTIONAL FILM RESEARCH PROGRAM. Evaluation of the film: *Military Police Support in Emergencies (Riot Control)* TF19–1701. Technical Report SDC 269–7–52. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1954.

Problem: Does a filmic treatment of illusionistic representationalism increase learning from an instructional film?

Sample: Three companies of military police trainees.

Subject taught: Riot control.

Key variables: Learning from illusionistic representational film, learning from filmograph without motion, learning from stock shot filmograph, Army General Classification Test scores, attitude toward riot control duty.

The hypothesis to be investigated was that more learning would take place from a film showing actual riot scenes than from a film without motion or using stock shots from a library of general crowd scenes. A film (TF19–1701) was prepared showing staged riot scenes filmed on location in several places of a large city. From this film, a filmograph (a series of "frozen frame" pictures on 16 mm film with accompanying sound track narration) was produced from frames of the staged crowd scenes. The same sound track was used as in the original film. A second filmograph was produced using stock shots of crowds from a picture library instead of the staged crowds. The same sound track was used for this filmograph.

Two tests were constructed to evaluate the effectiveness of three films. The first test was a 52-item multiple-choice test designed to measure the factual information of the film. The second test was a 20-item attitude inventory used to measure differential effects of the films on attitude of trainees toward riot control training and duty. The information test was pretested on a company of recruits prior to the experiment. Using split-half reliability test with Spearman-Brown prophecy formula correction, the coefficient of reliability for recruits who saw the film was .82 and .74 for recruits who did not see the film. Pretest information showed that learning could take place from seeing the original film. The difference between adjusted mean scores of trainees who saw the film and took the test and trainees who did not see the film but took the test was significant beyond the .0001 level.

The three film versions were then shown to three groups of recruits. The information test was then given to each group plus a group of recruits who did not see the film. The following shows the results:

Group	*Adjusted mean score*
Original picture	28.34
Stage group filmograph	26.57
Stock shot filmograph	26.59
No film	20.50

The comparison of the scores of those who saw the original film and the stage group filmograph showed a nonsignificant difference in favor of the original film group.

The responses for the attitude inventory toward riot control duty did not differ among any of the groups that saw any of the films, but there was a significant difference between all three film groups and the group which did not see the film. Trainees seeing the films on riot control had more positive attitudes than did trainees who did not see films.

Conclusions.—(1) Each of the films taught a significant amount of material. (2) The original film taught slightly more information than the filmograph versions, but not significantly more. (3) All three versions were equally effective in changing attitudes toward riot control duty.

The implication is made in the study that the added expenses of creating an illusion of reality is not necessary for effective teaching of riot control.

138. IRWIN, J. V., and A. E. ARONSON. "Television teaching: Conventional lecture versus highly visualized film presentations." Madison, Wis.: University of Wisconsin TV Laboratory Bulletin No. 11, 1958. See also NAEB Research Fact Sheet, Series I, 62, *NAEB Journal* 18 (March 1959), 1F–2F. (Abstract).

> *Problem*: Comparative effectiveness of teaching hearing techniques by face-to-face and film demonstration instructional methods.
>
> *Sample*: [Not given in above reports.]
>
> *Subject taught*: Hearing testing techniques.
>
> *Key variables*: Face-to-face, TV teaching.

In the fall of 1958 students in Speech 25, *Correction of Speech Disorders*, were taught hearing testing techniques by two methods of instruction: film demonstrations and face-to-face instruction. The effectiveness of both techniques was evaluated by testing both the studio and monitor groups using two kinds of examinations, an objective verbal exam and a filmed situational type exam.

Authors report it was thought that previous failures of research to show statistically significant differences in the two modes of teaching was due to utilization of only a verbal examination. A second purpose of this experiment was to demonstrate any differences between the studio and monitor groups.

It was concluded from the results that (1) students made higher examination grades after verbal teaching when tested verbally and after demonstration teaching when tested with a filmed situational examination; (2) there was no statistically significant difference between TV and face-to-face taught groups.

139. IVEY, SARA M., and NORMAN DEMARCO. *A study of closed-circuit television as a teaching technique for speech improvement in the public school system.* USOE Project No. 278. Fayetteville, Ark.: Department of Speech and Dramatic Art, University of Arkansas, January 1961. (Mimeographed).

> *Problem*: Determine the effectiveness of ITV as inservice training and the speech improvement of pupils.
>
> *Sample*: 220 third-grade pupils from 10 classes.
>
> *Subject taught*: Oral communication.
>
> *Key variables*: Learning; ITV presentation.

Pupils were divided into two groups, one having 52 lessons on oral communication on 20-minute ITV; the control group having had no speech improvement. The 20-minute ITV lessons used AV materials and dramatizations.

Pupils took the following tests: the Bryngelson and Glaspey Picture Articulation Test, an articulation test, SRA Language Comprehension test, Audiovox Audiometric test, a critical listening test, a sociogram, the K-A Intelligence test, an auditory memory span test, and a speech sound discrimination test. Teachers took a 45-item program content test.

Analysis of covariance and t-tests indicated no significant differences on posttest scores between the two groups. A t-test indicated no significant differences between the scores of the experimental ($N=5$) or control ($N=5$) teachers on the program content test.

140. JACKSON, ROBERT. Learning from kinescopes and films. *Instructional TV Research Reports.* Technical Report SDC 20–TV–1. Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1952.

> *Problem*: Do introductory descriptions of kinescope as TV recordings increase learning?
>
> *Sample*: 240 airmen.

Subject taught: Atomic defense.

Key variables: Learning from kinescope and films under different introductory descriptions.

Four pairs of groups of 30 airmen each were matched on basis of age, rank, classification scores, and years of schooling. They were shown a kinescope or a film about atomic defense under different conditions of description about the film or kinescope. Learning from these devices was estimated by administering a 100-item true-false test. One test was based on the kinescope content, the other on the film content. Tests were pretested and standardized by scores of undergraduate college students in the New York metropolitan area. Each test was given as a pretest and a posttest and corrected for guessing by subtracting the wrong answers from the right answers. Final scores were determined by subtracting the corrected before scores from the corrected after scores. The four groups saw films or kinescopes and scored on the examinations as follows:

Group	*Saw*	*Told seeing*	*Scored*	*Confidence level of difference*
1A	Kinescope	Kinescope	36	
1B	Kinescope	Film	28	.01
2A	B&w film	Kinescope	40	
2B	B&w film	Film	26	.01
3A	B&w film	Kinescope	40	
3B	Color film	Film	25	.01
4A	Color film	Kinescope	34	
4B	B&w film	Kinescope	40	.30

The author concluded that students learned significantly more from viewing black and white and color films when they were introduced as kinescope recordings rather than direct films. Students also learned significantly more from viewing a kinescope recording which they were told was a kinescope recording than they did from viewing a kinescope recording they were told was a film.

This effect of increased learning from kinescope introductions was attributed to (1) a novelty effect of kinescope recordings which are associated with television which may motivate learning, (2) an impression of recency or immediacy which may be associated with television, or (3) a cultural bias for technological sanctions which may motivate learning.

This study was replicated in 1955. See Summary No. 134.

141. JACOBS, JAMES N., and JOAN K. BOLLENBACHER. "An experimental study of the effectiveness of television versus classroom instruction in sixth grade science in the Cincinnati Public Schools, 1956–57." *Journal of Educational Research* 52 (1959), 184–189.

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: 315 sixth-grade students.

Subject taught: Grade 6 science.

Key variables: Learning, TV teaching, face-to-face teaching.

Twelve classes of grade 6 science located in 12 schools were taught by TV and face-to-face methods of instruction. Six classes were taught by TV and six classes taught by face-to-face methods. One teacher taught the TV sections and six regular classroom instructors taught the face-to-face section. All classes used the same outline of material to be taught and met three times a week.

Students in both groups were chosen from IQ-ranked schools so that for each instructional method there would be two classes each of high, middle, and low ability. Classes within and between methods on instruction were also matched on location, size of school, and past achievement records. Two tests of achievement were used: (1) the Elementary Science Test of the California Test in social and related sciences, and (2) a locally constructed test of general science information. The first test was a pretest and used as an adjusting variable. The second test was used as a posttest to measure learning from the instructional methods. There was no significant difference between methods of instruction groups for the pretest, but within the groups the TV high-ability and middle-ability and the face-to-face low-ability groups scored significantly higher than their counterparts in the other group.

Results.—Using analysis of covariance for evaluating the data, the following comparisons were made:

	Adjusted means			
Ability level	*TV taught*	*Face-to-face taught*	*t*	*p*
High	45.63	40.51	5.06	Beyond .01
Middle	32.77	33.15	0.29	NSD
Low	32.19	38.24	5.40	Beyond .01

Conclusions.—(1) There were significant gains in learning for all groups and methods of instruction. (2) TV instruction was significantly better for high-ability students than face-to-face instruction. (3) Face-to-face instruction was significantly better for low-ability students than TV instruction. (4) There was no significant difference between methods of instruction for middle-ability students. (5) Further research is needed, says the author, to determine the cause for differential learning gains for methods of instruction.

142. Jacobs, James N., and Joan K. Bollenbacher. "Teaching ninth grade biology by television." *Audio-Visual Communication Review* 8 (1960), 176–191.

Problem: Determine the relative effectiveness of pupil achievement in televised and face-to-face biology classes, the relative effectiveness by ability level, of instructional methods, and determine pupils' attitudes toward television.

Sample: About 400 ninth-grade Cincinnati pupils.

Subject taught: Biology.

Key variables: ITV and face-to-face presentation, learning, ability level, and pupils' attitudes.

Pupils were assigned to ITV or non-ITV groups. ITV pupils watched 30-minute television lessons and had 20 minutes of follow-up. All pupils took alternate forms of the Cooperative Biology test as pre- and posttests, the Facts About Science test, an instrument used to assess attitude toward television, and a questionnaire.

An analysis of covariance controlling on initial cooperative biology test scores indicated that ITV pupils' scores on the cooperative biology posttest were significantly higher (.05 level) than face-to-face pupils. There was not a significant interaction between method of instruction and ability level.

An analysis of variance run on the Facts About Science test controlling on pretest scores indicated no significant differences between the scores of ITV and face-to-face pupils and no significant interaction between method of presentation and ability level. Pupils were neutral or favorable toward ITV.

143. Jacobs, James N., Joan Bollenbacher, and Mildred Keiffer. "Teaching seventh-grade mathematics by television to homogeneously grouped below-average students." *Mathematics Teacher* 54 (1961), 551–555.

Problem: Determine intrinsic effectiveness of TV as means of instruction.

Sample: 258 students, 1½ to 2½ years retarded in arithmetic achievement.

Subject taught: Mathematics.

Key variables: Learning, TV teaching, face-to-face teaching, arithmetic achievement.

During the spring of 1959, pupils with arithmetic grade equivalents between 4.5 and 5.5 were identified by scores on Stanford Intermediate Arithmetic Achievement Test. Schools were selected to participate in the experiment. Selected students in three junior high schools were formed into 12 classes. Six classes (two in each school) were taught mathematics by TV and six other classes (two in each school) were taught mathematics by face-to-face instruction. Instruction began in September. In March the Metropolitan Intermediate Arithmetic Achievement Test, Form Bm, was administered to all groups.

Results.—(1) There was no significant difference between TV and face-to-face taught students on the computation section of the criterion test (MIAAT). (2) Four of the five comparisons on the problem-solving and concepts subtest of the criterion test (MIAAT) favored the TV-taught classes but only two differences were significant at the .05 level of confidence.

Conclusions.—Television instruction is equally effective to face-to-face teaching instruction in teaching computation skills to the below-average students. Television instruction tends to be superior to face-to-face instruction for teaching problem solving and concepts to the same group. Television instruction appears to be more effective with homogeneously grouped students than heterogeneously grouped students based on comparisons of this experiment with other experiments conducted in the school system.

144. Janes, Robert W. "An educational experiment with on-campus open-circuit television." *Journal of Educational*

Sociology 34 (1961), 300–308. Also in NAEB Research Fact Sheet, Series I, 98, *NAEB Journal* 20 (1961), 1–2. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: 375 college students.

Subject taught: Social science.

Key variables: TV teaching, face-to-face teaching, viewing location, class attendance, attitude, interest in subject matter.

A social science course was presented over open-circuit television to students regularly enrolled in college. TV students could choose location for viewing instruction (residence halls, TV-equipped classrooms, or other areas). Control section taught face-to-face met in a large lecture hall on the campus with the same instructor as TV-taught sections. Students could choose which method of instruction they preferred and could change method any time during the semester. Questionnaires were administered in the fourth and fourteenth weeks of the semester to measure student attitude; interviews were conducted with students during the semester; observations of student behavior were made; and reports from student discussion leaders were collected.

Results.—At the beginning of the semester, 47 percent of the students were in the TV section and 53 percent in the face-to-face section. By the fourteenth week, 11 percent of the face-to-face students transferred to the TV section, and 2 percent of the TV students transferred to the face-to-face section. Eighty-six percent of the TV students saw the lectures in one place and 14 percent used a variety of viewing places. Students tended to view lectures in their place of residence. Students viewing lectures in residences tended to be positive in their evaluation of the method of instruction, but students viewing lectures in TV-equipped classrooms tended to be negative toward the instructional method.

Academic performance, measured by student grades and attendance, for the TV-taught group averaged a middle C and for the face-to-face taught group averaged a high C. Students with the lowest scores and the lowest rankings in high school classes were found in the 14 percent of students in the course who did not regularly attend lectures. In the TV section, the poorer students had irregular and unorganized patterns of viewing while the better students attended regularly and viewed lessons in an organized manner.

Conclusions.—(1) The TV presentations had more appeal than the classroom lectures taught face-to-face. (2) Students tended to view televised instruction in the residences. (3) The face-to-face students made slightly higher grades. (4) There was no significant difference in attitudes toward sociology for either method of instruction. (5) Certain unique gains relative to student motivation and increasing amount of space available for instruction may be possible through utilization of televised instruction with in-residence viewing.

145. JANTZEN, VICTOR WARREN. "The effectiveness of television teaching of American Government compared with regular classes in Wichita High School South." *Dissertation Abstracts* 24 (1963), 1029.

Problem: Determine the relative effectiveness of televised and face-to-face presentation of American government.

Sample: 165 high school seniors.

Subject taught: American government.

Key variables: Television and face-to-face presentation; learning.

Students were randomly assigned to control and experimental groups. Initially, all students took School and College Ability Tests, plus the High School Civics Test of the USAFI, and the Social Studies section of the Sequential Tests of Educational Progress. Chi square technique did not reject the thesis that the two groups were random samplings from the same population.

F ratios and *t*-tests showed no significant differences among scores between the two groups, except that scores on individual unit tests for the national government and local government units were higher in the face-to-face group than in the ITV group.

146. JOHNSON, F. CRAIG. "Feedback in instructional television." *Journal of Communication* 10 (1960), 140–146. (See also abstract of his doctoral dissertation, *Speech Monographs* 26 (1959), 115.)

Problem: Effectiveness of students in TV studio to provide feedback to instructor.

Sample: 160 students viewing, 80 students in studio.

Subject taught: Listening skills.

Key variables: Feedback from students in studio, sex, learning, speakers.

Eight speakers, faculty members chosen at random, presented information on listening skills to students in viewing rooms by closed-circuit television. Four of the speakers had 20 male students with them in the studio to provide feedback during instruction. The other four were alone in the studio with the exception of the television crew. None of the speakers had prior TV-speaking experience. Each speaker was given a copy of the material to be presented in an outline form and told to develop his presentation in any manner he thought acceptable to the audience and the occasion.

Eight groups of students from Speech I, Fundamentals of Speaking, were chosen to receive instruction. There were 10 men and 10 women students in each group. Each group went to a viewing room and heard one of the speakers present the information. The initial ability of students to comprehend what they heard was measured on the Brown-Carlsen Test of Listening Comprehension. Student learning was measured on a four-part test of content of the lectures. Each part of the test was a different form of question, i.e., multiple choice, true-false, completion, and matching.

Results.—(1) The initial ability of the students to comprehend what they heard had no significant effect on the amount of information learned as measured by the content test. (2) There was no significant difference in learning between the groups taught by an instructor with feedback and those taught by an instructor without feedback.

Conclusions.—Feedback, as provided in this study, does not appear to have a significant effect on communication. The differences in achievement that were found in the experiment came more from the differences in the instructors than the variability of feedback.

147. JOHNSON, F. CRAIG, and others. *An investigation of motion picture film and the program analyzer feedback to improve television teacher training.* USOE Project No. 334. Athens, Ohio: Ohio University, April 1960. (Mimeographed).

Problem: Evaluate the program analyzer, sound film, and audiotape as television teacher-training aids.

Sample: 40 teachers and 1,250 Ohio University freshmen.

Key variables: Audiotape, audiotape and program analyzer, sound film, sound film and program analyzer, and self-evaluation only; peer and students' ratings of teachers.

Forty teachers made three ITV presentations of one lesson and one ITV presentation of another lesson. Freshman students were randomly assigned in groups of seven or eight to view one of the 160 kinescopes. Lesson presentations were also evaluated by a peer-teacher group who rated teachers' effectiveness on a five-point scale. The program analyzer was used to sum all ratings. Intercorrelations of content, delivery, interest, and teaching effectiveness made by the peer-teacher group correlated well with the program analyzer ratings, so that just the program analyzer ratings were used by the students.

Analysis of variance and covariance technique indicated no significant differences between the ratings given teachers who reviewed their presentations using sound film and those using only an audiotape. Also there were no significant differences between the audiotape group and those teachers who had no review of their presentations. Student ratings (mean) of teachers' effectiveness were significantly lower than ratings by peer teachers.

148. JOHNSON, GRACE NICHOLS, and FRANCES HARTY. "The Norfolk city experiment in instructional television: The big picture, September 1957–June 1960." Norfolk, Va.: Norfolk City Public Schools, Educational Television Project [1960]. (Report of Second Year abstracted in *NAEB Journal* (Research Fact Sheet, Series I, 80), 18 (December 1959), 1–4.)

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 10,266 students.

***Subjects taught*: Science, Spanish, the arts, American history, and geometry.**

***Key variables*: IQ, previous achievement scores, socioeconomic level, subject-matter pretests and posttests.**

Students in four elementary, two junior high, and three senior high schools received instruction in five subjects for three years of experimentation. Matched groups of students in the same schools were taught the same subjects by face-to-face methods of instruction. The numbers of students and the grade levels for the courses were: Grade 5 Science, 1,413; Grade 6 Science, 1,488; Grade 5 Spanish, 973; Grade 6 Spanish, 1,047; Grade 5 The arts, 973; Grade 6 The arts, 1,047; Grade 8 American history, 1,539; Grade 9 General science, 956; and Grade 10 Geometry, 830.

Using standardized tests the following comparisons between pretests and posttests were made:

Course	*Comparison*
Geometry	**Significant difference favoring face-to-face instruction.**
American history	**Significant difference favoring TV instruction for white students. Nonsignificant difference favoring face-to-face instruction for Negro students.**
Elementary science	**Significant difference in gain for Grade 5 and Grade 6 students in white schools taught by TV. Nonsignificant gains favoring TV instruction for Negro schools.**

***Conclusions*.—Children in larger than normal sized classes learned as much from televised instruction as those in conventional sized classrooms. Based on the number of comparisons made, the authors concluded that students tended to learn as much from television teaching as from face-to-face teaching.**

This study also includes a survey of the uses of instructional television in the Norfolk schools, a description of the administration of the project, the training of the television teachers, and a summary of subjective reactions to the project by students, teachers, and parents.

149. JOHNSON, HILDEGARD BINDER. *A Comparative Study of an Introductory Geography Course on ETV in the Classroom.* Saint Paul, Minn.: Macalester College, 1960.

***Problem*: Comparative teaching effectiveness, learning and retention of television and face-to-face teaching of college course.**

***Sample*: TV-taught group $N=66$. Face-to-face, *N* not specified.**

***Subject taught*: Introductory geography.**

***Key variables*: TV, face-to-face instruction. Learning gains measured by multiple-choice test given as pretest, posttest, and delayed retest.**

There were 66 students enrolled in a geography course offered over open-circuit ETV Station KTCA. An experimental group of 44 students viewed the course on-campus and 22 enrolled from off-campus. The control group was composed of two sections of the geography course taught face-to-face on the campus by the same instructor who taught the TV course. Students were given a 50-item multiple-choice test as a pretest. The same test was given as posttest for final examination in the course. The same test was again given as a delayed posttest to measure retention 3 months after the conclusion. All of the students who enrolled in the course did not take the delayed posttest, but all of the TV group did and most of one of the face-to-face sections.

Reliability of test was .75 measured by split-half method using maximum likelihood estimates of the correlation coefficients and adjusting for number of items. Students in TV class scored significantly higher on posttest as final examination than on pretest (*t*-ratio was 9.3 which was significant at the .001 level). Therefore, author concludes TV is an effective means of instruction. Variability from pretest to posttest was significant at only the .20 level and author concludes this was due to chance. Both face-to-face taught sections also increased learning significantly with a nonsignificant increase in variability.

Permanence of learning was tested by administering the same posttest as a delayed posttest three months later. TV-taught students retained 96 percent of the material contained on the test with nonsignificant changes in scores and variability. Only one of the two face-to-face sections could be examined for retention. They retained

95 percent of the material on the final test with nonsignificant changes in scores and variability.

Comparisons between the TV taught and the face-to-face taught groups were obtained by analysis of variance and analysis of covariance with adjustment for high school rank and MSAT scores. Significantly higher achievement was noted for the two face-to-face sections. There was a nonsignificant difference in the interactions of ability levels and methods of instruction.

The author concluded that (1) students learned significantly from both face-to-face and TV instruction, (2) students retained a high percentage of material learned after three months, (3) students of high ability learn more than students of low ability regardless of method of instruction, and (4) students taught face-to-face achieved a higher mean score than did students taught by TV.

150. KALE, SHRIKRISHNA VASUDEO. Learning and retention of English-Russian vocabulary under different conditions of motion picture presentation. State College: The Pennsylvania State College, 1953. (Multilith).

Problem: Determine the relative effectiveness in retention of English-Russian noun and verb pairs with different presentations.

Sample: 409 college students.

Subject taught: Russian-English nouns and verbs.

Key variables: Words alone, words with still pictures, with silent motion pictures, with sound motion pictures and sound motion pictures with learner participation.

Still pictures were more effective than words alone and sound pictures were more effective than still pictures. However, there were no differences between sound pictures, and sound pictures and learner participation.

All differences disappeared on retention tests after one week.

See Summary No. 109. This report contains Kale's original study plus an additional study with some modifications and refinements.

151. KANNER, JOSEPH H., SANFORD KATZ, and PETER B. GOLDSMITH. "Evaluation of 'intensive' television for teaching basic electricity." Long Island: Army Pictorial Center, January 1958. *Audio-Visual Communication Review* 7 (1959), 307–308. (Abstract).

Problem: Determine the relative effectiveness of 38 hours of continuous learning by ITV and face-to-face presentation.

Sample: 124 trainees.

Subject taught: Basic electricity.

Key variables: Learning, retention, and aptitude level; ITV and face-to-face presentations.

Trainees were divided into experimental and control groups; the same instructors and materials were used for both groups. The experimental group had 38 hours of ITV over a 5-day period, and the control group had 38 hours of face-to-face instruction over the same period. Students in both groups took a retention test one month later.

There were no consistent differences between the scores of the experimental and control groups. Aptitude level was more important than the instructional medium in determining test performance.

152. KANNER, JOSEPH H., and WESLEY P. MARSHALL. "Television in basic training: The improvement of training by television." *Audio-Visual Communication Review* 11 (1963), 191–199.

Problem: Determine learning from ITV.

Sample: 312 trainees at Ft. Dix.

Subject taught: Basic training.

Key variables: Television and face-to-face presentation; learning; aptitude.

Two companies were matched by Armed Forces Qualification Test scores. One company received face-to-face basic training; the other company had 58 hours of ITV and 30 hours of preview-review ITV given in their barracks after hours.

All trainees were tested immediately after each lesson presentation. In addition to these 25 tests, all trainees also took a 240-item multiple-choice and a 50-item pictorial-identification test.

For the 25 tests, the ITV company achieved significantly higher scores (.05 level) 11 times, the face-to-face company 6 times, and the other 8 tests showed no significant differences. Dividing each company into four groups by AFQT scores indicated that both superior and lower ability trainees in the TV company achieved higher scores than face-to-face trainees of comparable ability. Scores of ITV trainees on the 240-item test and on the 50-item pictorial test were significantly higher (.05 level) than scores of face-to-face trainees.

153. **KANNER, JOSEPH H., and ALVIN J. ROSENSTEIN.** "Television in army training: Color vs. black and white." *Audio-Visual Communication* Review 8 (1960), 243–252.

Problem: Determine the relative effectiveness in learning from black and white and color television.

Sample: 368 trainees at Ft. Monmouth.

Subjects taught: Electronics and photographic lessons.

Key variables: Color and black and white television presentation; learning.

Matched pairs were assigned to color or black-and-white viewing conditions. Trainees were tested over each of the 11 lessons. Some of the test questions were designed particularly to assess the influence of color on learning, as color coding on resistors. Of the 11 comparisons between color and black-and-white groups, there was a significant difference for only one lesson (.05 level, favoring the color groups). When trainee scores were analyzed by high- and low-ability groups, it was found that low-ability groups tended to learn more from color than from black and white, and high-ability groups more from black and white. However, for practical purposes, the differences were not great enough to justify the use of color television. There were no significant differences between groups in the number of color or noncolor test items answered correctly.

154. **KANNER, JOSEPH H., R. P. RUNYON, and O. DESIDERATO.** "Television in Army training: Evaluation of television in Army basic training." *George Washington University Technical Report 14.* Washington, D. C.: Human Resources Research Office, 1954. [Kumata, Hideya. Abstract in *An Inventory of Instructional Television Research.* Ann Arbor: Educational Television and Radio Center, 1956. p. 70–73.]

Problem: Comparative effectiveness of TV, TV recording, and face-to-face instruction.

Sample: About 400 Army trainees.

Subject taught: Basic military skills (see below).

Key variables: TV teaching, recorded (kinescope) TV teaching, face-to-face teaching, Army General Classification Test, immediate achievement, long-term retention, student reaction.

Research using Army basic trainees at Camp Gordon, Ga., was carried out to answer the following questions: (1) differences between TV and regular instruction for basic training courses, (2) differences between kinescope recordings and regular instruction, (3) differences in retention between TV and regular instruction, (4) differences between high- and low-aptitude basic trainees on learning and retention through TV and regular instruction, (5) the effects of a kinescope review on retention compared with effects of no further training on retention for high- and low-aptitude trainees. In addition, trainee reactions to TV were obtained.

Fourteen hours selected from the first 8 weeks of basic training were used. Subjects selected were Functioning of the M1 Rifle; Signal Communications; Military Justice; Mines and Booby Traps; Map Reading (7 hours); Squad Tactics; Defense against Air and Armor; and Disassembly of the Light Machine Gun.

Two experienced instructors, rated superior by the camp instructional committee, were chosen for each of the 14 hours. Each instructor taught both TV and face-to-face instruction hours. For 11 of the 14 hours, one instructor taught face-to-face while the other taught the TV class. The instructors reversed their roles when the same subject was taught to another group. For the remaining 3 hours, the same instructor taught both the face-to-face and the TV classes simultaneously.

Two basic training companies of 200 trainees were used for comparisons. Each of the companies were split into two groups matched for Area I scores on the Army Classification Test. Several other basic training companies, similarly split into two matched groups, were used for the kinescope vs. face-to-face instruction experiments.

For the 14 hours 17 tests were constructed, including written tests consisting of multiple-choice, fill-in, and picture identification items and performance tests. A posttest-only design was used for all of the comparisons. To obtain a baseline performance, all of the tests except the performance test for Light Machine Gun disassembly were given to another basic training company which resembled the test companies. This company had not received any of the 14 hours of instruction when tested.

Findings.—For immediate posttest, comparisons between face-to-face instruction and TV instruction showed: (1) There were no significant differences between the mean scores of both groups on 12 of the 17 tests. (2) In 5 of the 17 tests, there was a significant difference in mean scores of the two groups. In each, TV scores were superior. (3) Splitting both groups into high- and low-aptitude subgroups, comparisons within subgroups showed that—

1. No differences could be found between TV and face-to-face instruction on high-aptitude groups. A possible explanation by the authors is that since high-aptitude people scored near the ceiling of the tests, there was little room for differences.
2. Among low-aptitude groups, seven of the 17 tests showed no significant differences in comparison of mean scores. For 10 of the 17 tests, significant differences appeared. In each instance, TV was superior to face-to-face instruction.

For retention testing, administered about a month after the instruction, results were: (1) There was decrement in amount retained for both the TV and the face-to-face instruction groups except for two tests—M1 functioning and military justice—where both groups scored higher than their immediate posttest scores. The authors explain this by saying that the M1 rifle is a constant companion of the basic trainee and thus learning goes on after the end of formal instruction. Similarly, the mere presence in a military environment is enough to account for learning in a subject such as military justice. (2) In 10 of the 14 retention tests, there were no significant differences between mean scores of the TV and face-to-face instruction groups. Tests on the light machine gun and one hour of the map reading series were not given. (3) In 4 of the 14 tests, there were significant differences in comparisons of mean scores. In each, TV was superior. (4) Splitting both groups into high- and low-aptitude groups, it was found that—

1. In 10 of 14 tests, there were no significant differences between mean scores of low-aptitude men.
2. In 4 of the 14 tests, there were significant differences among low-aptitude men. In each, TV was superior.
3. No tests were run on the scores of high-aptitude men.

In comparisons between kinescope recording and face-to-face instruction (kinescopes were used for only 7 of the 14 hours), it was found that: (1) there were no significant differences between face-to-face instruction and kinescope groups for six of the seven tests, and (2) that there was a significant difference between the two groups on one of the seven tests. The kinescope group was superior in this comparison.

In five of the tests, part of the trainees who had received face-to-face instruction, TV instruction or kinescope instruction were given a kinescope refresher before taking retention tests. Results showed that (1) performances in all five tests were significantly higher than scores made on immediate posttests. (2) Those who did not take a kinescope refresher showed a decrement in amount learned, except for the military justice test (discussed above). (3) Low-aptitude men showed significantly higher scores over their immediate posttests after kinescope refresher training. (4) Gains after refresher training were such that low-aptitude men scored almost as high as high-aptitude men scored on their immediate posttests.

For the novelty of motivation effects of TV training, authors state that the evidence points against a novelty effect operating. Efforts were made to reduce additional motivation to TV students by telling all trainees that they were engaged in an important study. The experimenters went so far as to give distinctive insignia to all involved. Although novelty effects were not tested, a look at test scores after TV instruction revealed that the largest differences favoring TV were for three instructional hours which came after 5, 8, and 13 exposures to TV instruction. Authors state that perhaps TV effectiveness is related to subject-matter content.

Items in the tests were categorized by the type of information being measured and the presentation methods employed to impart the information. The following six categories were devised: (1) Imparting simple items of information, (2) teaching nomenclature of pieces of equipment, (3) teaching interrelationships among parts of equipment, (4) teaching paired-associate learning, (5) giving recognition training, and (6) teaching manipulation of small pieces of equipment. By tabulating the number of items showing significant superiority for either regular or TV instruction within each of the six categories, the authors found that for the last four categories, there was a significant difference in the number of items favoring television.

155. Kanner, Joseph H., and others. "Television in Army training." *Audio-Visual Communication Review* 6 (1958), 255–291.

Study I

Problem: Determine the effectiveness of 38 hours of televised instruction in 5 days, compared with 5 days of face-to-face instruction.

Sample: 281 enlisted men.

Subject taught: Power maintenance.

Key variables: Television and face-to-face presentation, learning, retention.

Trainees were divided into TV and face-to-face groups. Tests were given after morning and afternoon sessions, or 10 tests altogether for the week. A retention test was given one month after the first week.

Scores of face-to-face trainees on the 10 tests were slightly higher than scores of trainees in the TV groups. The authors indicate this might be due to the lecture having almost no visualization and therefore little interest. The high-level aptitude group was consistently higher than the low-aptitude group regardless of presentation method. Scores of the face-to-face trainees on the delayed (one-month) posttest were about the same as scores of TV trainees. No indication was found that intensive television sessions are more detrimental to classroom learning than face-to-face instruction.

Study II

Problem: Determine the effectiveness of using television and decreased training time, and to evaluate rapid training of TV teachers.

Sample: Ft. Gordon trainees.

Subject taught: Power maintenance.

Key variables: Training time, teacher experience and kinescope presentation, learning.

The 10 tests described above were shortened by dropping nondiscriminating, too hard, or too easy items, and modified into six tests. These were given after morning and afternoon sessions for each of the 3 days of the instruction. The former 50-minute periods were condensed to half-hour kinescopes. The same delayed posttest used in study I was used in this study.

Analysis of variance and t-tests indicated that scores of the trainees receiving 38 hours of instruction were significantly higher on both immediate and delayed posttests than were scores of the trainees receiving 16 hours of instruction. There were no differences in immediate or delayed posttest scores among trainees in the kinescope, live experienced instructor, or live inexperienced instructor groups.

It may be that part of the learning differences between the 38-hour group and the 16-hour group were due to (1) less time to take the achievement test in the 16-hour session and (2) less comfortable viewing conditions in the 16-hour sessions.

156. KANSAS CITY (MO.) PUBLIC SCHOOLS. "Report of the educational television project in Kansas City, Missouri, Public Schools; 1958–59, 1959–60, 1960–61." Kansas City (Mo.) Public Schools, 1961. NAEB Research Fact Sheet, Series I, 110, *NAEB Journal* 22 (July 1963), 1–2. (Abstract).

Problem: Comparative effectiveness of television and face-to-face instruction.

Sample: 12,000 students.

Subjects taught: History, Spanish, science, citizenship.

Key variables: TV teaching, face-to-face teaching, attitudes toward TV as means of instruction.

No significant differences were reported from TV and face-to-face instruction for the classes in history. TV was discovered superior to face-to-face instruction for Spanish and science. Citizenship classes had trouble accepting televised instruction and responded less favorably.

Authors conclude that TV instruction tended to be as effective as face-to-face instruction regarding learning as measured on tests.

Study contains descriptive report of the administration of the 3-year project.

157. KANTOR, BERNARD R. "Effectiveness of inserted questions in instructional films." *Audio-Visual Communication Review* 8 (1960), 104–108.

Problem: Determine learning from films having questions inserted.

Sample: 617 seventh-grade pupils in three Los Angeles high schools.

Subject taught: The sunfish (science).

Key variables: Inserting questions in the film, learning, retention, ability, age, socioeconomic status, and IQ.

Three versions of the film were prepared. In one version, eight questions were inserted in the film before the content was covered, and in another version the questions were inserted after the content had been covered. A control version had no questions inserted.

Pupils were assigned to one of the three screenings. All pupils took a pretest a week before the film, a parallel form posttest, and a delayed (5 week) retention test. California Test of Mental Maturity scores, parents' occupations, age, sex, socio-economic status (SES) based on a modified Warner scale, and a "language index" were available for all pupils.

Analyses of variance, covariance, and *t*-tests indicated that pupils with a high language index had significantly higher test scores than pupils with a low language index. Pupils in higher SES levels had significantly higher test scores than pupils of average SES levels, who had significantly higher test scores than pupils in lower SES levels. There were no significant differences of pupils' scores among any of the film versions for any of the three tests taken.

158. KAPLAN, ROBERT. "Teaching problem-solving with television to college freshmen in health education." *Dissertation Abstracts* 23 (1963), 3224–3225.

Problem: Compare conventional with problem-solving method when both are presented via ITV.

Sample: 420 freshmen at Ohio State.

Subject taught: Health education.

Key variables: Conventional method and problem-solving method; multiple-choice and problem-solving measures of learning.

Eight half-hour conventional method ITV lessons and eight half-hour problem-solving method ITV lessons were prepared. Freshmen were divided into two groups. All were given a 35-item multiple-choice test and a subjective problem-solving test for pre- and posttests. Problem-solving included defining the problem, choosing the best hypothesis, and presenting supporting facts. Scale guides were devised to score the subjective test. All freshmen also took a 13-item Likert-type attitude questionnaire at the end of the quarter. Multiple-regression equations were developed using mean scores and means of gain scores, controlling for OSPE scores, age, sex, college and course grades.

There were no differences between experimental and control groups on the multiple-choice instrument, but the experimental group had significantly higher scores on the problem-solving instrument (.01 level). Multiple-choice scores and subjective problem-solving scores were related to Ohio State Psychological Examination scores (.01 and .05 level respectively). Freshmen coeds had significantly higher course grades and problem-solving scores than freshmen men.

159. **Karsner, Milo Gist.** "An evaluation of motion-picture loops in group instruction in badminton." *Dissertation Abstracts* 13 (1953), 1082.

Problem: Evaluate the effectiveness in using motion picture loops as an adjunct to teacher explanation, demonstration and student practice.

Sample: College men.

Subject taught: Badminton.

Key variables: Instructor explanation and demonstration, student practice and demonstration film loops; ratings, performance, and learning.

The author used three experimental situations: (1) explanation and demonstration of each stroke by the instructor, followed by a film loop while the instructor explains the stroke; (2) a film loop of each stroke while the instructor explains the stroke, and (3) explanation and demonstration of all strokes by the instructor, followed by students' practice of all strokes, followed by all the film loops, while the instructor explained the strokes being projected.

Each group, including a control group, was given pre- and posttests on badminton knowledge, motor tests, and received ratings of ability in badminton knowledge.

No significant differences were found between any of the experimental or control groups in terms of the above measurements, or by tournaments, or by questionnaires designed to measure students' motivation. It was concluded that the use of motion picture loops did not affect learning or motivation more than not using loops.

160. **Kasten, D. F., and W. F. Seibert.** A study of televised military science instruction. TVPR Report No. 9. [Lafayette Ind.:] Purdue University, July 1959. (Mimeographed).

Problem: Determine students' attitudes toward ITV, and compare the relative learning of students in ITV and face-to-face classes.

Sample: 59 ITV students and 54 face-to-face students.

Subject taught: Military science.

Key variables: Attitudes and learning; ITV and face-to-face presentation.

All students had face-to-face instruction the first four weeks of the semester. For the last 12 weeks, 59 students received military science by a visualized ITV presentation, and 54 students continued with face-to-face instruction. The ITV instructor was a captain and the face-to-face instructor was a master sergeant.

Using ACE scores, students in both groups were divided into high-ability (126–164), medium-ability (111–126), and low-ability groups (91–110). Students took various achievement instruments and two forms of the Purdue Instructional Television Attitude Scale. (The two forms had equivalent-form reliabilities from .74 to .89).

On 4 of 13 achievement comparisons, scores for face-to-face presentation were significantly higher (.05 and .01 levels) than the ITV scores. There was no significant interaction between ability level and method of instruction.

Face-to-face and ITV students tended to have neutral attitude scores on the Purdue instrument; ITV students tended to have higher scores than face-to-face students.

161. **Kazem, Ahmed Khairy Mohamed.** "An experimental study of the contribution of certain instructional films to the understanding of the elements of scientific method by tenth-grade high school biology students." *Dissertation Abstracts* 21 (1961), 3019.

Problem: Compare the relative effectiveness of informational-expository and historical-dramatic films.

Sample: Biology class students in four Detroit high schools.

Subject taught: Science films.

Key variables: Viewing two informational-expository films, two historical-dramatic films, one film of each category, and no films; learning, sex, and ability level.

A biology class in each high school was assigned to one of the four treatments. All students took a special content test on the scientific method before and after the treatment. Students were matched on grade level, pretest score, IQ, reading ability, sex, age, and school.

Critical ratios and *t*-tests were used. Students in the three experimental treatment groups had significantly higher posttest scores than students in the control group. Students viewing the informational-expository films had significantly higher scores on the scientific method posttest than students viewing the historical-dramatic films, but not significantly higher than students in the combination informational-expository and historical-dramatic treatment. There were no significant differences among posttest scores of students in any of the three experimental groups. There were no significant differences in the scores of boys or girls. Above-average students made significantly higher gains between the pre- and posttest than average-ability students.

162. KENDLER, TRACY S., JOHN OLIVER COOK, and HOWARD H. KENDLER. "An investigation of the interacting effects of repetition and audience participation on learning from training films." Paper presented to American Psychological Association Convention, 1953. *American Psychologist* 8 (August 1953), 378–379. (Abstract).

Problem: To determine whether increasing relevancy of response to a training film by overt audience response increases the effectiveness of repetition of the film.

Sample: 28 high school classes.

Subject taught: Map reading.

Key variables: Overt audience participation, repetition of viewing, learning.

Seven groups of subjects, with four high school classes in each, were shown experimental versions of a standard military film on conventional map signs. One group saw only the introductory section of the film. The remaining six groups saw the introduction plus either one, two, or three consecutive presentations of a review. Three groups were instructed before the review showings to call out the names of the map signs as they were shown on the screen. The other three groups were given noncommittal instructions about audience participation. A test of map signs was given immediately after the last film showing to all groups and repeated to measure retention 4 weeks later.

Results.—(1) Increasing the number of reviews seen produced higher scores with the increments decreasing with increase in showings. Difference between one review and no review was significant in favor of one review. The difference between one and three showings was statistically significant only for initial scores. (2) Overt oral responses by the audience produced increases on both initial and delayed tests, but the difference was significant only for the initial scores. (3) There was no interaction between repetition and participation.

Conclusions.—(1) One review increases learning, but increases decrease when more repetitions are added. (2) Overt participation during a review increases learning.[1] (3) These effects decrease with repetition and intervening practice between successive showings is recommended.

163. KETCHAM, CARL H., and ROBERT W. HEATH. *An experiment to determine the effectiveness of motion pictures with sound in the teaching of material which cannot be directly portrayed in visual images.* USOE Project No. 378. Tucson: University of Arizona [n.d.]. (Offset). (See *Audio-Visual Communication Review* 11 (1963), 114–123.)

164. KETCHAM, CARL H., and ROBERT W. HEATH. "The effectiveness of an educational film without direct visual presentation of content." *Audio-Visual Communication Review* 11 (1963), 114–123.

Problem: Determine learning from film in which visual images do not directly portray subject matter.

Sample: Undergraduates at the University of Arizona.

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[1] For further investigation of this conclusion see Levine, Seymour. Role of motivation in the effects of "Active review on learning from a factual film." *American Psychologist* 8 (1953), 388–389.

Subject taught: William Wordsworth.

Key variables: Sound track only, sound and picture, face-to-face presentation; repetition, learning, and note-taking.

Students were divided into six groups (*N* varied from 16 to 35 per group). One group saw and heard the film once. The second heard the sound track once. The third saw and heard the film three times. The fourth group heard the sound track three times. The fifth saw and heard the film three times and took notes. The sixth group received a conventional classroom presentation. Groups three and four were also retested.

All students took a 48-item examination on the film. Scores of verbal aptitude of the College Qualification Tests were available for all students.

An analysis of covariance controlling for verbal aptitude scores indicated a significant difference among groups (.01 level). It was concluded that a film having visual images which do not directly portray subject matter results in greater learning than sound only. Three film presentations resulted in significantly more learning than one.

165. KIMBLE, G. A., and J. J. WULFF. "The effects of 'response guidance' on the value of audience participation in training film instruction." Human Factors Operations Research Laboratories, USAF, Report No. 35. *Audio-Visual Communication Review* 1 (1953), 292–293. (Abstract).

Problem: Determine the relative effectiveness of giving guidance during participation with no guidance.

Sample: 300 AF trainees.

Subject taught: The slide rule.

Key variables: Guided and unguided practice and ability level.

Trainees were divided into two groups: one seeing a film having aids to the performance of correct participation responses, the other group viewing a film with no sound or visual cues to correct responses.

The guided practice group had significantly higher posttest scores than the unguided group, especially for difficult material. This was also true for examples not presented on the film and for men of both greater and of lesser ability.

166. KING, CALVIN ELIJAH. "A comparative study of the effectiveness of teaching a course in remedial mathematics to college students by television and by the conventional method." *Dissertation Abstracts* 20 (1959), 2177.

Problem: Determine the relative effectiveness of learning by face-to-face and television presentation.

Sample: College students.

Subject taught: Remedial mathematics.

Key variables: Television and face-to-face presentation; students' attitudes.

Students taking Math 400 by television in one quarter were compared with students who had taken the same course by face-to-face presentation the previous quarter. All students took the Ohio State University Math Placement test as a final exam, six attitude questionnaires during the course, and a teacher and course evaluation questionnaire.

There were no significant differences in achievement scores of students taking the course by ITV and those who had taken it face-to-face. Television students making "D" and "E" grades preferred television less than television students making "A" and "B" grades.

Television students liked their quiz section instructors better than the face-to-face students had liked their classroom teachers. Television students thought the class was more poorly organized than did the face-to-face students and that their chance of participation was less than the face-to-face students.

167. KISHLER, JOHN PULLMAN. "The differential prediction of learning from a motion picture by means of indices of identification potential derived from attitudes toward the main character." *Abstracts of Doctoral Dissertations, The Pennsylvania State College,* Vol. 13. State College, Pennsylvania: The Pennsylvania State College, 1951. p. 407–413.

Problem: Determine the effect of identification with the main character in learning from a film.

Sample: 814 students in introductory psychology at Penn State.

Subject taught: Film, *Keys of the Kingdom.*

Key variables: Identification, prestige, and learning.

All students were given a rank-order scale of the prestige of the role of "Catholic Priest," and a Thurstone-type attitude scale of religious tolerance before and after viewing *Keys of the Kingdom.* Students were also given a multiple-choice instrument to measure general information from the film after the viewing.

Students who rated the role of Catholic priest as having high prestige tended to learn more from the film than those who ranked the priest's role as low.

Catholic students tended to have higher scores on the information instrument than non-Catholics.

168. Klapper, Hope Lunin. *Closed-circuit Television as a Medium of Instruction at New York University 1956–1957.* New York: New York University, 1958.

Problem: Determine the relative effectiveness of ITV and face-to-face presentation, and assess students' attitudes.

Sample: See below.

Subjects taught: English, man's cultural heritage, and history of civilization.

Key variables: Students' and teachers' attitudes, initial knowledge level, learning, no production aids and many production aids; ITV and face-to-face presentation.

English

English composition was given the first semester, English literature the second. All students took the Cooperative English Test and the Cooperative Test of Literary Comprehension, wrote themes, and took an attitude questionnaire at the beginning and at the end of the course. The first semester there were 116 ITV students and 115 face-to-face students; the second semester 105 ITV students and 88 face-to-face students. The ITV students had a 45-minute ITV presentation and then 30 minutes of face-to-face discussion in groups of 10 to 15; the face-to-face students had a 90-minute class in groups of 25 to 30.

When first semester ITV and face-to-face students were divided into three initial knowledge level groups, *t*-tests indicated no significant differences between the two groups for each ability level on gain scores. Face-to-face students tended to have higher gains than ITV students.

When second-semester students were similarly divided into initial knowledge level groups, *t*-tests indicated only one significant difference (.05 level) between ITV and face-to-face groups, and that was for the high knowledge level, and favored ITV students. ITV students in the other two levels tended to have higher gain scores than face-to-face students.

When first-semester students were compared by theme grades, *t*-tests indicated no significant differences between ITV or face-to-face groups except that for the low initial knowledge level, face-to-face students made significantly higher gains than ITV students (.01 level).

When second-semester students were compared by theme grades, *t*-tests indicated no significant differences between groups except that in the high initial ability level, face-to-face students had significantly less lower (.01 level) theme grades than ITV students.

The author suggested that learning on ITV may partly be a function of experience.

Students of some instructors improved significantly more than did those of other instructors. Instructor may be a more important variable than method.

Participating teachers were not favorable toward ITV, but amount of antipathy varied widely.

Man's cultural heritage

The 119 students for the first semester and 106 for the second were divided into four sections, which met for 2 hours twice a week. The first semester, only a blackboard was used; the second semester, the same course was repeated using several visual-aid devices. Each section viewed a 45–50 minute ITV lecture and had the remainder of each period for discussion. All students took a 98-item objective achievement test (K–R $r = .76$) before and after the course, a questionnaire to assess attitudes toward ITV, and one to assess attitudes toward production aids.

Eighty-seven percent of the second-semester students thought production aids increased course interest, and about two-thirds thought the production aids increased learning.

About 70 percent of the students in both semesters were favorable toward the ITV course at its start; 59 percent of the first-semester students were favorable toward the course at its end, but 90 percent of the second-semester students were favorable toward the course at its end. The first-semester students were equally divided between choosing an ITV course and a large face-to-face course; the second-semester students preferred an ITV course over a face-to-face large lecture three to one.

Gain achievement scores of second-semester students were significantly lower than gain achievement scores of first-semester students. For both semesters, students in the low initial knowledge level had a significantly greater achievement gain than students in the middle or high initial knowledge levels. However, second-semester students had higher pretest achievement scores than first-semester students, and the test had a low ceiling.

Students of some instructors made significantly higher scores than did students of other instructors.

History of civilization

Students were divided into six ITV sections of 21–25 students each, and one face-to-face class of 57. The ITV sections met for 2-hour periods twice a week, and had a 55-minute ITV lecture followed by discussion. The face-to-face class met four times a week for one hour. Four of the discussion sections were conducted by relatively inexperienced instructors. All students took an attitude toward ITV questionnaire before and after the course. Final grades in the course served as achievement measures.

Students did not generally find ITV impersonal, and were not especially concerned about the lack of personal contact. They were divided on whether not being able to ask questions was good. Initially, 77 percent liked being enrolled in the ITV course, but at the end of the course, only 48 percent indicated they liked it. Students were evenly divided on whether they would prefer ITV or a face-to-face large lecture. Students of one instructor were consistently and significantly more anti-ITV than were students in the other five classes. The most favorable class had no contact with the TV lecturers. The main lecturer's class did not often differ significantly in attitude from the total group.

There were no significant differences in final grades of ITV and face-to-face students.

Students in three courses were classified by observers into high, middle, or low overt-attention groups. There were no significant differences in achievement among the attention groups in any of the courses.

169. KRAFT, MARY ELIZABETH. "A study of information and vocabulary achievement from the teaching of natural science by television in the fifth grade." *Dissertation Abstracts* 22 (1961), 1097–1098. (Compare studies by Gerard T. Amirian, Homer Justin Dietmeier, and A. Cornelia Sheehan.)

Problem: Compare the effectiveness of various methods of utilization of ITV in teaching fifth-grade natural science.

Sample: 90 fifth-grade classes in towns around Boston.

Subject taught: Fifth-grade natural science.

Key variables: Teacher training, study guide utilization, class participation, individual projects, student ability and television presentation; learning and vocabulary scores.

All pupils took two specially constructed instruments: a 75-item multiple-choice science information test (r_{11}=.86) and a 150-item matching science vocabulary test (r_{11}=.98). These tests were given in September, December, and May. All pupils in the 90 classes viewed the 30 half-hour programs of natural science. Eighteen classes served as a control group, 24 classes had teachers trained in the utilization of television, 24 had teachers trained in elementary science, and 24 of the class teachers had no special training. Half of the 72 classes comprising the experimental group used the television series to begin the unit each day and half used the series to end the unit each day. Half the teachers received study guides and half did not. Half of the classes worked on common class assignments, and half worked on individual projects.

Class means rather than individual scores were used. Analysis of variance technique showed that all combinations of experimental variations were more effective than the control group (television alone) as measured by scores on the achievement test. Each IQ level in the experimental group showed greater gain and a greater rate of gain than the corresponding IQ level in the control group.

Those classes viewing the television series after their classroom work had higher scores on the science information test when they were given a common assignment; of the classes who viewed the series before their classroom work, those having individual assignments had higher scores on the science information test.

Vocabulary scores were not related to any specific experimental treatment or combinations.

Brighter students tended to learn more science in all groups. Gains on the science information and vocabulary tests were not related to sex or to parents' occupations.

170. KREBS, ROBERT EDWARD. "The effects of educational films on student perceptions." *Dissertation Abstracts* 19 (1957), 1030.

Problem: Determine whether education films have an effect on the similarity of viewed perceptions.

Sample: Two high school chemistry classes.

Subjects taught: Atomic energy and organic chemistry and petroleum.

Key variables: Filmed and face-to-face presentations; learning and retention.

One group saw a series of films on atomic energy, while the other group did not. Then the groups switched and the latter group saw films on organic chemistry and the former group did not. Students took four tests before, after, and 4 weeks after the study of each topic: (1) an interpretation of projected silhouettes test, (2) a multiple-choice factual test, (3) a multiple-choice test where all the alternatives were considered correct, and (4) a mental-abilities test.

Analysis of variance, t-tests and z-tests indicated that film students tended to perceive the specific learning situation more alike than nonfilm students.

Students in film groups tended to perceive facts and information more the same way than nonfilm students. The experimental students did not have higher test scores except for topic-related responses for irrelevant silhouettes. There were no significant differences in retention scores between the two groups.

171. KUIPERS, RAY HARRY. "A comparison of student perceptions of televised and conventional instruction." *Dissertation Abstracts* 22 (1962), 4221.

Problem: Compare students' motivation and reactions to face-to-face and ITV teaching.

Sample: 144 students and 283 teachers.

Key variables: Face-to-face on-campus and television off-campus presentation; motivation, personal contact.

Students completed a questionnaire having 12 open-ended items and 18 five-point scale items. Teachers made written communications which were subjected to content analysis.

The author concluded that ITV off-campus students were as highly motivated as face-to-face on-campus students, that the ITV off-campus students of one professor tended to be more highly motivated than his on-campus face-to-face students, and that some teachers were more successful than others in being able to reduce the lack of personal contact over television.

172. KUMATA, HIDEYA. *Attitude change and learning as a function of mode of presentation and prestige of instructor.* East Lansing: Communications Research Center, Michigan State University, 1958. (Mimeographed).

Problem: Determine learning, retention, and students' attitudes in face-to-face and ITV courses.

Sample: See below.

Subjects taught: Social science and introduction to advertising.

Key variables: Learning, retention, prestige level, instructor, and attitudes; ITV and face-to-face presentation.

Social science

The 840 students were separated into 20 sections. Independent variables were presentation method (ITV and face-to-face), perceived prestige (high, medium, low), and instructors (three different ones). Each cell of this 2x3x3 design had one section. Two other sections acted as control groups. An analysis of variance run on American Council on Education Psychological Examination for College Freshman (ACE) scores indicated no significant differences between experimental and control groups. The lecture was on "power politics" and was 30 minutes long. Students took a semantic differential attitude and an achievement test immediately after the lecture. The former test had concepts of Teaching over Television, Face-to-Face Teaching, Caste Power Pyramid, Authority, Power Politics, Oligarchical Power Pyramid, and Democratic Power Pyramid. For the first two concepts, the following adjectival scales were used: good-bad, fair-unfair, pleasant-unpleasant, valuable-worthless (evaluative); active-passive, fast-slow (activity); strong-weak, large-small (potency); interesting-dull, clear-hazy. Similar scales were used for the other concepts. The achievement test had 15 multiple-choice items. Students took the tests again 8 weeks later.

Over 90 percent of the students could identify the lecturer's prestige position. The *t*-tests on the scales of the attitude instrument among groups indicated that ITV students thought teaching by television was clearer than either the control or face-to-face groups. For the concept Authority, both ITV and face-to-face groups were less favorable than the control group, and both were less unfavorable than the control group toward the concept Power Politics. For the concepts Caste Power Pyramid and Oligarchical Power Pyramid, the ITV and face-to-face groups were more unfavorable. Both ITV and face-to-face groups were more favorable toward the concept Democratic Power Pyramid than the control group. Both experimental groups had significantly higher learning scores than the control group.

On the immediate posttest for the concept Teaching by Television, analysis of variance generally indicated no significant differences, except that on both the activity and potency factors, a significant method of presentation and prestige level interaction was found. Students with prior ITV experience tended to be more favorable to ITV. Generally, analysis of variance showed no significant differences on the concept Face-to-Face Teaching. There were no consistent significant differences for the five concepts dealing with the subject matter. Analyses of variance for instructor evaluations revealed significant differences among the three instructors.

On the immediate learning posttest, face-to-face students had significantly higher scores than ITV students. Students of one instructor learned significantly more than students of another.

Analysis of variance run on difference scores between the immediate and delayed posttests indicated generally no significant differences for the concept Teaching by Television, except for the activity scales, where a significant method of presentation and prestige interaction was found. The only significant *F* ratio in the analysis of the concept Face-to-Face Teaching (difference scores) was for method of presentation and prestige interaction for the scale interesting-dull.

For the five concepts dealing with the subject matter, the most consistent significant *F* ratios were for instructors, prestige level, or interaction between prestige and instructor.

Neither mode of presentation seemed to favor high- or low-ability students. Face-to-face students in three ability levels tended to make higher scores than ITV students in comparable ability levels.

Introduction to advertising

There were 106 students in face-to-face, in-studio, and ITV classes. The same instructor taught all three classes. Both ITV and face-to-face lectures had visual aids. Students had regular assignments, mid-term and final examinations, and two special quizzes. At the end of the course, students also took a semantic differential attitude instrument having the concepts Teaching by Television (with scales good-bad, easy-difficult, personal-impersonal, clear-hazy, interesting-boring, active-passive, and easy to take notes-hard to take notes); A Career in Advertising (with scales attractive-unattractive, approve-disapprove, good-bad, high prestige-low prestige, and active-passive); and The Advertising Business (with scales ethical-unethical, strong-weak, fair-unfair, good-bad, and high paying-low paying). Classes met twice a week and the course lasted for one quarter.

Analysis of variance on ACE scores indicated no significant initial differences among the three groups (face-to-face, in-studio, and ITV).

Analysis of variance and a t-test indicated that face-to-face students received significantly higher grades on a copywriting problem (.05 level) than ITV students. Analysis of variance and a t-test on a special 10-item quiz indicated that face-to-face students had significantly higher scores (.05 level) than ITV students. There were no significant differences between in-studio and ITV students on either of these two measures. Analysis of variance and t-tests on a special eight-item quiz indicated that both ITV and face-to-face students had higher scores than in-studio students (.05 level). There were no significant differences among groups on mid-term examination scores. Analysis of variance and a t-test indicated that face-to-face students had significantly higher final examination scores than ITV students. Analysis of variance and a t-test indicated that face-to-face students had significantly higher final grades in the course (.01 level) than ITV students.

Generally there were no significant differences among groups on any of the attitude concepts.

173. KUMATA, HIDEYA. *Teaching advertising by television—Study II.* East Lansing: College of Communication Arts, Michigan State University [n.d.]. (Duplicated).

Problem: Determine the relative effectiveness of face-to-face and ITV presentation and determine students' attitudes.

Sample: 57 face-to-face and 54 ITV students.

Subject taught: Advertising.

Key variables: Face-to-face instruction and ITV presentation; learning, relevant and irrelevant cues (details and principles), and attitudes.

ITV students were divided into two groups on the basis of ACE (L) scores. Half were designated an in-studio group and half an ITV classroom section. Students did six assignments, took mid-term and final examinations, and four special quizzes. One of the quizzes was a 15-item short answer test, and another quiz dealt with details and principles of advertisements. The other two quizzes were 8 and 10 items long. Students took a semantic differential instrument with three concepts: Teaching by Television, A Career for Me in Advertising, and The Advertising Profession, before and after the course. A talk-back system was available.

Analyses of variance on the six assignments indicated no significant differences among scores of students in the three groups. Analyses of variance on all four quizzes indicated no significant differences among scores of students in the three groups. For the quiz dealing with advertising details and principles, chi square indicated the face-to-face students recalled significantly more details than principles, the studio group equal amounts of each, and the ITV group recalled significantly more principles than details. The author suggested that color (details) interfered with recalling principles for the face-to-face group. Analysis of variance on the final exam grades indicated that ITV students had lower scores than in-studio or face-to-face students. There were no significant differences in final grades in the course among the three groups.

There were no significant differences among groups on pretest attitude scales. Groups rated Teaching by Television as slightly good, quite passive, slightly clear, impersonal, and hard to take notes. For A Career for Me in Advertising and for The Advertising Profession, all groups were quite favorable.

The t-tests run on difference scores for the face-to-face group on the concept Teaching by Television indicated no significant differences. For the ITV group, t-tests indicated a significant (.01 level) shift toward being easier to learn. For the in-studio group, t-tests indicated significant shifts toward being more passive and easier to learn. For the concept on A Career in Advertising, there were no significant differences on any of the scales for both the ITV and in-studio groups. The face-to-face group changed to regard the concept as significantly more attractive, better, having faster advancement, and with more approval. For the concept The Advertising Profession, both the face-to-face and the in-studio groups changed to regard the concept as significantly more ethical, fairer, and better. The ITV group rated it as being significantly better than they had at the start of the course.

174. LANE, BENNIE RAY. "An experiment with programed instruction as a supplement to teaching college mathe-

matics by closed-circuit television." *Dissertation Abstracts* 23 (1963), 3817–3818.

Problem: Compare three methods of supplementing ITV mathematics lectures.

Sample: Math students at George Peabody College.

Subject taught: Fundamental principles of mathematics.

Key variables: Kinescope, teacher assistance, programed booklet, learning.

All pupils viewed 12 mathematics lectures on television the first part of the class period. Then for the remainder of each class period, group one viewed a kinescope of solutions of exercises and a review of concepts, group two had a teacher-led session in which the teacher answered questions and did homework problems, and group three studied a programed booklet based on assigned exercises. After the 12 lessons, all students took an achievement test and gave estimates of study time and comments about the follow-up session. The achievement test had a K–R #20 reliability of .78.

Analysis of covariance was used. Scores on the Davis Test of Functional Competence in Mathematics and the Verbal Battery of the Lorge-Thorndike had a multiple correlation with the achievement test of .80. Adjusted group means were: group one, 20.39; group two, 20.61; group three, 24.00. Differences between group three and the other two groups were significant at the .05 level.

Estimates of study time were analyzed by analysis of variance and by Kruskal-Wallis analysis of ranks. Both techniques rejected nondifference of study-time estimates among groups at the .05 level. The mean study time (hours) as estimated by students in group one was 20.95; group two, 17.38; group three, 10.40.

175. LANER, S. "The impact of visual aids displays showing a manipulative task." *Quarterly Journal of Experimental Psychology* 6 (1954), 95–106.

Problem: Comparative effectiveness of motion picture and filmstrip instruction.

Sample: 75 (12 university students, 63 RAF men).

Subject taught: Disassembly, repair, and reassembly of a window.

Key variables: Intelligence, film teaching, filmstrip teaching, learning, performing a task.

Twelve students and 50 RAF men viewed a sound film on the repair of a window with a broken sashcord. Thirteen RAF men saw a filmstrip of the same operation and heard a recorded commentary describing the operation.

After instruction, each student in the groups was asked to demonstrate his skill in repairing the window by going to model with a broken sashcord, disassembling it, repairing the cord, and reassembling the window. In prior analysis, the author determined there were 23 suboperations necessary for correctly repairing the window. Students were rated on the number of these suboperations correctly performed and the time necessary for completion.

Results.—There were no significant differences between methods of instruction attributable to the method of instruction. Aspects of visual aid material, such as motion and photographic realism, which are often assumed to have special cognitive value, do not play a part in the learning of a manipulative task. The intelligence of the subjects is not an important factor in learning a manipulative task.

176. LEANDERSON, ROBERT ELMER. "A statistical analysis of the contribution of visual materials to a unit on telephone communication." *Dissertation Abstracts* 13 (1953), 1115.

Problem: Determine the relative effectiveness of a manual, film, and filmstrips, separately and used together, to teach using the phone to elementary pupils.

Sample: Five groups of fifth graders, from 13 elementary schools, totaling 350 pupils.

Subjects taught: Teaching use of the directory and using the phone.

Key variables: Manual, film, and filmstrip presentations; intelligence, reading ability and having a phone at home; using a phone directory and dialing.

Groups were equated by a phone knowledge test and an intelligence rating. A random sample (110) also took a performance test initially, which included: (1) an identification test, which, the author states, measured the ability to use the phone directory properly, and (2) a dialing test. Each group then received instruction in using the phone: one with a manual, one with a filmstrip, one with a motion picture, one group receiving all these media, and one control group. Instruction lasted for 3 days. The knowledge tests and performance tests were then readministered.

The multimedia group had significantly higher scores on the knowledge test than any other group. All the single-media groups had higher scores on the knowledge test than did the control group. Children not having phones in their homes made more improvement from the pre- to post-knowledge test than did those having phones. Initially, girls did better than boys, but no differences were found on the posttest. On the performance tests of identification and dialing there were no significant differences between the groups.

177. LEMASTER, LELAN KENNETH. "Filmed demonstrations with manual class demonstrations vs. conventional demonstrations in introductory woodwork." *Dissertation Abstracts* 23 (1962), 164–165.

Problem: Determine the effect of pupil learning by using film demonstrations before the instructor's demonstration.

Sample: Junior high school boys.

Subject taught: Industrial arts.

Key variables: Film and demonstration, and demonstration-only presentations; learning and performance.

Six groups of experimental and control groups were given the Lorge-Thorndike Non-verbal Intelligence Test, the Industrial Arts test and the Manipulative Industrial Arts test, before and after the 6-weeks unit. During the 6 weeks, instructors in the experimental groups presented eight filmed demonstrations before their personal demonstrations to the class, while the same instructors in their control classes presented their personal demonstrations only. Although students were not randomly assigned to experimental or control groups in each school, evidence indicated that the groups were similar in intelligence, technical knowledge, and skills.

On the basis of differences in scores on the three instruments, it was concluded that the film presentation helped pupils to learn more related technical information, helped pupils to use manipulation skills more effectively, and reduced the number of individual repeat demonstrations required of the instructor.

178. LEMKE, OLGA MARIE. "The utilization of television instruction in guidance at the sixth grade level." *Dissertation Abstracts* 23 (1963), 2756, 4799. (See also USOE Project No. 491. Portland, Maine: [n.d.]. Mimeographed).

Problem: Determine the effectiveness of television in guidance of sixth-grade pupils.

Sample: Sixth-grade pupils from ten elementary schools in Portland, Maine.

Subject taught: Guidance.

Key variables: Television and teacher-led presentations; personality, guidance, and socioeconomic status (SES) scores.

Various techniques, such as role playing, panels, films, drawings, and demonstrations, were used in 21 ITV programs. Guests and peer-group members were used. Pupils were divided into three groups. The ITV group received the programs with no preparation or follow-up. The teacher-led group was taught the same material by their own teachers. (Teachers were also encouraged to use any material they considered helpful.) The control group received no guidance information.

Pupils took the California Test of Personality, the Mooney Problem Check List and an informational guidance test as pre- and posttests. In addition, the Sims Score Card of socioeconomic status was obtained from all pupils.

Analysis of variance revealed that the ITV group had significantly higher scores on the informational guidance test than the teacher-led group, and both groups had higher scores than the control group. The ITV and teacher-led group showed similar gains in adjustment as measured by the California Test of Personality, but both were higher than the control group (.05 level). Differences in kind and number of problems were associated with differences in SES, sex, and ability.

179. **Lepore, Albert R., and Jack D. Wilson.** *Project Number Two: An Experimental Study of College Instruction Using Broadcast Television.* San Francisco: San Francisco State College, 1958.

Problem: Comparative effectiveness of television and face-to-face methods of instruction.

Sample: 1,261 college students, 350 high school students.

Subjects taught: Science, psychology, social science, English, creative arts.

Key variables: Learning, TV teaching, face-to-face teaching, TV students at home, number of discussion sections per week, home and library assignments, and attitudes toward the teaching-learning process.

This study compares the performances and attitudes of three groups of students (television at home, television on the campus, and face-to-face instruction on campus) taught by the same instructor in six college-level courses. The bases for comparison are achievement; critical thinking; self-insight; motivation; attitudes toward television, subject matter, and course content; and opportunities for friendships. Also investigated were varying amounts of discussions, demonstration activity, and home and library assignments. High school students were included in the sample to determine feasibility of using televised college courses for accelerated high school instruction. The teaching-learning process was also investigated to identify the similarities and differences in television and classroom instruction.

Six courses in major academic areas at San Francisco State College were taught through the facilities of open-circuit ETV station KQED. Students received instruction by television at their homes or in campus classrooms. Matched groups of students were taught on the campus by face-to-face methods of instruction.

In addition to the college students, the lessons were used by a group of selected high school students in eight high schools and a group of highly selected inmates of a state prison.

Comparisons for achievement were accomplished by analysis of covariance with adjustment for academic aptitude (SCAT test), grade-point average, content achievement, and motivation.

Results.—Students taught by televised instruction compared favorably with students in conventional classes in acquiring information, excepting in the creative arts class in which the conventionally taught students tended to do better than the television-taught students. High, low, and average ability students learned equally well when taught by face-to-face or television methods of instruction. In the science classes, all of the various kinds of supplemental instruction (weekly discussions, biweekly discussions, demonstration activities, and home and library assignments) appeared to be equally effective with both media of instruction.

Both instructional media and all four forms of supplemental instruction appeared to be equally effective for critical thinking and self-insight. But students in five of the six courses made higher, but not significantly higher, scores for self-insight when taught face-to-face.

Selected high school students in English and science tended to make smaller gains from televised instruction than did the college students with whom they were matched.

Analysis of student and teacher statements describing instruction indicated that there were more kinds of effective or ineffective teaching incidents for conventionally taught classes than for TV-taught classes. Students in both instructional media felt what the teacher did or said was important, but reacted more negatively to this emphasis in conventionally taught classes. Students noted something of value unique to each instructional media, but found less variety of satisfactions and dissatisfactions in televised instruction.

Students accepted television as a means of instruction and students who viewed at home were more positive toward television than students in television classes on campus. In a followup study of students who had taken the first English course in the fall by television and the second course in the spring by face-to-face instruction, there was an overwhelming preference for face-to-face instruction.

Conclusions.—(1) TV is an effective means of instruction for courses in which acquisition of information is a primary goal, (2) for courses in which primary goals are direct experiences or attitude modification, the role of TV is unclear, (3) further study should be made of the effect of college instruction of high school students before beginning an intensive program, (4) television appears to be more constrictive in supplying satisfying and dissatisfying instruction experiences. Further study should be done to determine to what extent the material learned is affected by how the learner learned to learn.

180. LEVENS, A. S. *Teaching the fundamentals of orthogonal projection.* USOE Contract No. G704139. Berkeley: College of Engineering, University of California [n.d.]. (Offset).

Problem: Determine the effectiveness of films to teach students and teachers the thought model technique (describing objects, points, etc. in space with the hands).

Sample: 105 California college students; 12 teachers.

Subject taught: Fundamentals of orthogonal projection.

Key variables: Teaching using the thought-model method, kinescope and face-to-face presentation.

Six 25-minute kinescopes of solving problems by the thought-model process were made. These were also shown to 12 teachers beforehand. Students were assigned to one of three groups: face-to-face presentation with the instructor using the thought-model process, viewing the kinescopes with discussion periods following, and face-to-face presentation with the instructor using his normal teaching techniques. Students took a test following each of the six sessions.

The *t*-tests indicated that students in the first group had significantly higher scores (.01 level) than those in the second, that those in the first group had significantly higher scores (.05 level) than those in the third, but that there were no significant differences between scores of students in groups two and three. There was an indication that the difference among individual teachers can be great.

181. LEVINE, SEYMOUR. "The role of motivation in the effects of 'active review' on learning from a factual film." Paper presented at American Psychological Association, 1953. *American Psychologist* 8 (August 1953), 388–389. (Abstract).

Problem: Effect of motivation on learning from instructional film.

Sample: 939 Air Force trainees.

Subject taught: World maps.

Key variables: Viewing review showing of a film, motivation, learning.

In a previous study (Summary No. 162), increased learning occurred when viewer gave overt oral responses during a film review showing. Author hypothesized that increased learning was due to either active review (overt oral participation) or increased motivation to learn resulting from the review procedure. This study investigates the latter part of this hypothesis.

Four groups of eight classes of Air Force trainees viewed a film on world maps. Half the classes saw the film and had an active review; the other half saw the film with no review session following. Within these groups half the classes were highly motivated to learn by instructions prior to film showing, while the other half was under low motivation from other instructions before film showing. The active review session consisted of having the class write answers to questions on the film. Correct answers to questions were given to students after review session.

Results.—(1) Significant gains in learning occurred for low-motivated, active-review students. (2) Significant, but much higher gains in learning occurred for highly motivated, active-review students.

Conclusion.—Under conditions of low introductory motivation, active-review procedures can result in gains due to motivation from review session.

182. LEVINSON, ELIAS. *Effects of motion pictures on the responses to narrative.* USOE Project No. 445. New York: New York University, 1962. (Offset).

Problem: Determine how junior high school students' responses to short stories are affected by seeing films of short stories.

Sample: 452 students in one school in Newark, N.J.

Subjects taught: O'Henry's *The Last Leaf* and *The Cop and the Anthem*, Daudet's *The Last Lesson*, and Poe's *The Tell-Tale Heart*.

Key variables: Reading the story only, reading and viewing, viewing before or after reading; ability, sex, age.

A 39-item test was constructed for each story (or film). One part of the test measured students' enjoyment and identification (empathy); another part concerned comprehension and vocabulary. An item analysis was made. K–A Intelligence scores or CTMM scores were available for all students. Students also took a standardized reading test.

Students were divided into three groups: reading only, reading then viewing, and viewing then reading. The films were shown once a week for four weeks.

Analysis of variance indicated that film viewing does produce a significantly different response from reading only. There were no significant differences between students' scores on the instrument in the viewing then reading or the reading then viewing groups, but viewing then reading students tended to have higher scores. High-ability students scored significantly higher than lower-ability students, but the lower-ability students tended to have high enjoyment and identification scores. Older students scored significantly higher than younger students. Girls tended to score higher than boys. Film viewing had no significant effect on girls' viewing but had a significant effect on boys' viewing.

183. Levonian, Edward. "Opinion change as mediated by an audience-tailored film." *Audio-Visual Communication Review* 11 (1963), 104–113.

Problem: Determine opinion change from a film especially produced for a given audience.

Sample: 540 UCLA students in education, psychology, public health, and business administration classes.

Subject taught: India's recent development.

Key variables: Information and opinion scores, pretest, immediate and delayed posttests; film presentation.

Students were divided into three groups. All students took a 36-item opinion and information questionnaire as a pretest. A week later two groups saw the film. One of these groups was given the questionnaire immediately as a posttest; the other was given the questionnaire a week later. The test-retest interval for the control group was one week.

Relative to the control group, both experimental groups showed significant (.01 level) changes in information and opinion scores. Relative to the delayed posttest experimental group, the immediate posttest experimental group showed significant changes in information and opinion scores. There were no significant differences in scores between students who gave their name and those who chose to remain anonymous.

184. Lofthouse, Yvonne Marie Sheriff. "An experiment with closed-circuit televised instruction in teacher education." *Dissertation Abstracts* 17 (1957), 1513.

Problem: Determine the relative effectiveness of learning in televised and face-to-face presentations and to determine students' attitudes toward ITV.

Sample: 56 undergraduate education students.

Subject taught: Methods and materials of the language arts.

Key variables: Television and face-to-face presentation; learning and attitudes.

Students were divided into two groups, matched on ACE scores, sex, curriculum, student teaching contact, and honor-point average. Each group received half a semester of ITV and half a semester of face-to-face presentation. Each half-hour presentation was followed by a 20-minute discussion period. The same instructor taught both classes. All students took attitude questionnaires and an essay test. The entire essay test was taken at the beginning of the course, half the test was taken halfway through the course (when the groups switched presentation methods), and the other half was given at the end of the course.

Chi square, rank correlation, and *t*-test techniques were used. There were no significant differences in examination scores between the ITV or face-to-face groups. There were no significant differences in students' attitudes toward the course, whether taught on ITV or by face-to-face methods; ITV students were also critical of technical deficiencies. Students preferred face-to-face over ITV presentations when instructor and teaching methods were constant. Seventy-five percent of the students said that limiting the discussion period to 20 minutes did not let them participate all they wanted to. Students regarded instructional procedures as being equally effective whether presented by face-to-face or by ITV methods, but regarded instructional materials as being less effective when presented by television. ITV teaching required more of the teacher's time.

185. LOS ANGELES CITY SCHOOL DISTRICTS. "An evaluation of closed circuit television for teaching junior college courses." Los Angeles: Division of Extension and Higher Education, Los Angeles City School Districts, 1957. *Audio-Visual Communication Review* 6 (1958), 237. (Abstract).

Problem: Determine learning from instructional television and face-to-face presentations, and to assess students' attitudes.

Sample: 270 junior high school students.

Subjects taught: Physics, physical education, geography.

Key variables: Television and face-to-face presentation, learning, attitudes.

The same teacher taught the television and face-to-face sections. All students took two questionnaires and were interviewed.

There were practically no significant differences in achievement scores of students in the studio, in TV classrooms, and in face-to-face classes. Eighty-four percent of the students thought that ITV was as good as face-to-face instruction; 46 percent wished to enroll in another ITV course. ITV teachers felt that ITV was practical and usually desirable.

186. LOS ANGELES CITY SCHOOL DISTRICTS. *An evaluation of closed-circuit instructional television in Los Angeles City College and Los Angeles Valley College.* Final Report. Los Angeles: Los Angeles City School Districts, 1959. (Offset).

Problem: Determine the relative effectiveness of ITV and face-to-face instruction.

Sample: See below.

Subject taught: See below.

Key variables: ITV and face-to-face instruction, achievement and attitudes.

Students in 1957 and the spring of 1958 were initially matched on Otis Quick-Scoring MA scores and pre-course scores on a subject-matter test, and t-tests compared the significance of differences. Students in classes later in 1958 were not initially matched, but analysis of covariance controlling on pre-course subject-matter test scores was used.

A table of the college, the courses offered, the number of students in each treatment (when there were both ITV and face-to-face treatments), and whether posttest score differences on subject-matter instruments were significant by t-tests or by analysis of covariance (fall 1958, and spring 1959) follows.

Spring 1957

College	*Course*	*Group*	*Number of students*	*Significant differences (if any)*
Los Angeles City College	Physics 11	Studio	33	None.
		ITV	36	
		Control	18	
	Health 10	Studio	26	Scores of control group were significantly greater than ITV group.
		ITV	23	
		Control	27	
	Health 10	ITV	31	None.
		Control	17	
	Geography 1	Studio	33	None.
		ITV	62	
		Control	23	

Fall 1957				
Los Angeles City College	Health 10	Studio	32	Scores of control group were significantly higher than other two groups.
		ITV	98	
		Control	45	
	Health 10	ITV	103	None.
		Control	49	
	Geography 1	ITV	66	None.
		Control	27	
	History 11	Studio	31	None.
		ITV	156	
		Control	26	
Los Angeles Valley College	Health 10	Studio	31	None.
		ITV	77	
		Control	31	
	Health 10	Studio	33	None.
		ITV	79	
		Control	35	
	History 11	Studio	Not usable	None.
		ITV	99	
		Control	29	
Spring 1958				
Los Angeles City College	Physics 11	ITV	48	None.
		Control	24	
	Health 10	Studio	Not usable	Scores of control group were significantly higher than ITV group.
		ITV	63	
		Control	40	
	Health 10	Studio	28	Scores of studio group were signficantly lower than scores of control group.
		ITV	161	
		Control	43	
	Geography 1	ITV	69	None.
		Control	24	
	History 11	Studio	25	None.
		ITV	130	
		Control	35	
Los Angeles Valley College	Health 10	Studio	Not usable	None.
		ITV	69	
		Control	28	
	Health 10	Studio	22	Scores of control group were significantly greater than ITV group.
		ITV	86	
		Control	28	
Fall 1958				
Los Angeles City College	Health 10	ITV	106	None.
		Control	38	
	History 11	Studio	31	None.
		ITV	80	
		Control	32	
	Music 32	ITV	25	Scores of control group were significantly greater than scores of ITV group.
		Control	60	
	Anthropology 1	ITV	63	Scores of control group were significantly greater than scores of ITV group.
		Control	33	
	Speech 1	ITV	19	None.
		Control	22	
	Speech 3	ITV	32	None.
		Control	28	

Los Angeles Valley College	History 12	Studio	10	None.
		ITV	64	
		Control	35	
	Anthropology 1	ITV	85	None.
		Control	19	
	English 2	Studio	21	None.
		ITV	40	
		Control	28	
	Biology 1	Studio	26	None.
		ITV	53	
Spring 1959				
Los Angeles City College	History 11	Studio	27	None.
		ITV	128	
		Control	35	
	Anthropology 1	ITV	58	None.
		Control	26	
	Music 32	Studio	3	Scores of control group were significantly higher than scores of ITV group.
		ITV	47	
		Control	51	
	Speech 3	ITV	22	None.
		Control	29	
	Speech 1	ITV	22	None.
		Control	19	
Los Angeles Valley College	Anthropology 1	ITV	91	None.
		Control	25	
	English 2	ITV	36	No significant difference between groups in final grades.
		Control	21	
	History 12	Studio	15	None.
		ITV	66	
		Control	31	

Students' reactions to ITV were varied. Most of the objections were from the students' inability to ask questions, or a belief that personal association with the instructor is an important part of college work. Students accepted ITV classes but preferred face-to-face classes. Students' opinions varied with the situation. Most students preferred an ITV class, if not too large, to a large face-to-face lecture class.

Television at the Los Angeles City College and Valley College was discontinued after the spring 1959 semester.

187. LOTTES, JOHN J., JR. "The effects of open-circuit television demonstrations of reading instruction on the observed classroom performances and attitudes of teachers." ***Dissertation Abstracts*** **21 (1961), 2633.**

Problem: Determine if a television series will change classroom performances or attitudes toward reading instruction of teachers.

Sample: 213 elementary schoolteachers.

Subject taught: Reading instruction.

Key variable: Television presentation, classroom performance, and attitude.

All 213 elementary schoolteachers were rated on classroom performance and attitude toward the individualized approach to reading instruction. The teachers were then randomly assigned to two treatment groups. One group viewed the series on reading instruction and the control group wrote weekly reports on reading instruction. (The latter was intended as a participation variable to assess any Hawthorne effects.) The television series consisted of 15 half-hour programs, presented one each week. After the series, all teachers were again rated on observed classroom performance and attitude toward reading instruction.

3

The television viewing group had a significant increase (.01 level) in performance and attitude toward reading instruction. The weekly report group had no increase and there was no significant interaction between the two treatments. The television presentations had a greater effect on changing actions and attitudes than the weekly report method did.

188. LUMSDAINE, A. A., R. L. SULZER, and F. F. KOPSTEIN. "The influence of simple animation techniques on the value of a training film." Human Resources Research Laboratories, Report No. 24, April 1951. *Audio-Visual Communication Review* 1 (1953), 140–141. (Abstract).

Problem: Determine the relative effectiveness of simple animation devices in learning from a film.

Sample: 1,300 AF basic trainees.

Subject taught: The micrometer.

Key variables: Animated and nonanimated films, pretesting or not, three or six examples of micrometer reading, following the film with a supplementary sound slidefilm; learning, and ability level.

Trainees were divided into 16 groups; each group received one of the 16 treatments resulting from the possible combinations of variables mentioned above.

Groups having the animated film learned significantly more than groups having the nonanimated film, regardless of pretesting, number of examples, or whether or not they saw the supplementary film. This was true for trainees of both above- and below-average intelligence. Trainees in the lower- and middle-intelligence range may have learned most.

189. LUND, KENNETH W., MAX D. ENGLEHART, and MARY M. NEE. "Teaching algebra and physics by means of TV." *Chicago School Board Journal* 38 (September 1956), 1–9.

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 2,405 Chicago high school students.

Subjects taught: Algebra and physics.

Key variables: TV teaching, face-to-face teaching, learning, teacher, student opinions.

Ten lessons in algebra (quadratics) were broadcast open circuit to students in 34 high schools. Ten lessons in physics (machines) were also broadcast to students in the same high schools. Objective examinations were given to all students receiving televised instruction. The results of these examinations were compared to results of same examinations given students who were taught the same material at about the same time by face-to-face instruction from a lesson outline prepared by the TV instructors. The examinations were divided into two parts: Part I covered material of elementary algebra and physics in which the students had previously been instructed and served as a measure of initial achievement level; Part II covered in detail the information contained in the TV lectures and lesson guides.

Results.—(1) TV instruction was as effective as face-to-face instruction in teaching both algebra and physics. All differences between adjusted scores for differing methods of instruction were nonsignificant but tended to favor the TV instruction. (2) Students felt that review of key points in TV presentation most helpful and classroom teachers should review lessons immediately after TV presentations. Students also expressed a need for talkback facilities with TV instructor. A minority of the students felt TV presentations were better organized, more direct, more interesting or greater incentive to learning than face-to-face instruction. (3) Classroom teachers generally felt TV instruction was less effective because too much material was covered too rapidly.

190. MACOMBER, F. GLENN, and LAURENCE SIEGEL. *Final Report of the Experimental Study in Instructional Procedures.* Oxford: Miami University, January 1960. (For reports on years previous to 1957–58, see earlier reports by the same authors.)

Problem: Determine the relative effectiveness of ITV and face-to-face presentations, and determine students' attitudes toward course content, instructor, ITV, and large-class instruction.

Sample: (Number of ITV students first):

1957–58: human behavior, 195 and 35; air science, 119 and 20; animal biology, 115 and 84. *1958–59*: human behavior, 205 and 42; American government, 61 and 78.

Subjects taught: See above.

Key variables: Achievement and attitudes; ITV, and small- and large-class face-to-face instruction.

Students took objective subject-matter tests (K–R #21 *r*'s generally ranged from .85 to .95), and tests of synthesis, problem-solving, and critical thinking (K–R #21 *r*'s ranged from .68 to .73). Students also took questionnaires before the course to determine their reactions to being assigned to an ITV or face-to-face situation, an attitude toward ITV and small face-to-face presentation scale (corrected split-half r=.89), and an attitude toward ITV and large face-to-face presentation Thurstone scale (corrected split-half r=.90) at the end of the course. Students also took a Thurstone scale on course content (corrected split-half r=.92) and a 24-item instructor rating scale (corrected split-half r=.91). Some students were interviewed.

The *t*-tests on objective subject-matter instruments and on critical thinking instruments for the courses offered 1957–58 and 1958–59 indicated no significant differences in scores of students in small face-to-face and ITV groups. Students' attitudes in two of the courses offered those two years were significantly more favorable toward face-to-face courses than toward ITV courses. In one course, low-ability students were significantly more favorable toward the ITV course, and in another, low-ability students were significantly more favorable toward the face-to-face course. In one course, high-ability students were significantly more favorable toward the face-to-face course. Overall, students tended to rate the instructor more favorably when teaching face-to-face than on ITV, and two of the differences for the 2-year period were significant. Generally high-ability (ACE score 65th percentile or higher) students were less favorable toward ITV than were low-ability (ACE score 35th percentile or lower) students.

Most teachers felt students learned the basic concepts as well in an ITV as in a face-to-face course. Most thought ITV was inferior to face-to-face instruction in the realization of the less tangible course objectives. They thought that as ITV teachers they had less influence on students' overall growth and development than as face-to-face teachers.

191. **Macomber, F. Glenn, and others.** *Experimental Study in Instructional Procedures.* Oxford: Miami University, Oct. 1, 1956.

Problem: Determine the relative effectiveness of ITV and face-to-face presentations, and determine students' attitudes.

Sample: (Number of ITV students first): educational psychology, 97 and 62; sociology, 131 and 129; human biology, 183 and 177; physiology, 90 and 30.

Subjects taught: See above.

Key variables: Learning and attitudes; ITV and face-to-face presentation.

Educational psychology students met for two weekly periods of 90 minutes each. Sociology and human biology classes met three times a week for 50 minutes each. Physiology students had three 50-minute ITV classes and one 2-hour lab. Experimental and control classes of each course were matched on Cooperative English Achievement scores, Cooperative Mathematics Placement scores, ACE scores, and grade-point averages for the previous semester. K–R *r*'s on objective test scores ranged from .48 to .94, with most of the *r*'s in the high eighties or low nineties. At the end of the first semester, students took Thurstone-type attitude scales of the teacher's effectiveness, appraisal of the course's content, and attitudes toward ITV or face-to-face instruction. Split-half *r*'s (corrected for length) ranged from .89 to .92.

The *t*-tests indicated no significant differences in achievement test scores between ITV and face-to-face students, except in the human biology course, where ITV students had significantly higher scores (.001 level). There were no significant differences in achievement test scores between high-ability ITV students and high-ability face-to-face students in any of the four courses (except human biology, where ITV students had significantly higher scores at the .05 level). Similar results were obtained for low-ability students.

There was no relationship between achievement scores and attitude scores. Students rated ITV instructors at least as favorably in the ITV sections as in the control sections. Students in the control sections tended to rate the course content more favorably than students in the ITV or large-class sections. The authors state that it is possible to give a course that ITV students prefer more than face-to-face students, and vice-versa. Students preferred a small class to either an ITV or a large face-to-face class. Generally students in ITV or face-to-face classes did not differ on whether they thought they learned as much, how well their class held their attention, the amount of personal contact they had with the instructor, and how well they thought they did in their class. Students were most dissatisfied with the lack of personal contact in an ITV class. ITV students became more negative over time. This decrease in attitude was attributed to greater boredom and the greater clarity of ITV lectures. There tended to be a relation between instructor's popularity and effectiveness rating and students' attitudes toward the ITV course. Students' negative attitudes toward large lecture classes might have been a function of their low attitude toward the large lecture class instructor. There was some tendency for high-ability students to have a more negative attitude toward ITV than low-ability students.

192. MACOMBER, F. GLENN, and others. *Experimental Study in Instructional Procedures.* Oxford: Miami University, Oct. 1, 1957.

Problem: Determine the relative effectiveness of ITV and face-to-face instruction, and determine students' attitudes toward course content, instructor, ITV, and teachers' attitudes about teaching on ITV.

Sample: (Number of ITV students first): human behavior, 300 and 59; physiology, 328 and 191; air science, 354 and 116; economics, 253 and 88.

Subjects taught: See above.

Key variables: Achievement and attitudes; ITV and small- and large-class face-to-face instruction.

All students took the Cooperative Test of English Achievement, the Cooperative Mathematics Placement Test, and the American Council on Education Psychological Examination. Most classes were also matched on scores on a subject-matter pretest, sex, and rank in class.

The *t*-tests on objective test scores indicated no significant differences between face-to-face and ITV sections for the first semester, but three of five *t*-tests (human behavior, air science, and economics) on objective test scores the second semester were significant favoring the face-to-face groups.

The *t*-tests on problem-solving and synthesis-test scores indicated no significant differences between face-to-face and ITV sections except for two essays in economics class, for which the face-to-face students made significantly higher scores than the ITV students. There were no significant differences between scores of students in face-to-face or ITV classes when students were divided by ability level for economics students, either on objective or on critical thinking tests, except that high-ability ITV students had significantly lower critical thinking test scores than high-ability face-to-face students. Generally there was no relationship between attitude toward ITV and achievement.

Students completed a Thurstone-type attitude toward the course scale (corrected split-half $r=.92$) and a 24-item instructor rating scale (corrected split-half $r=.91$). Except for one class, in which face-to-face students were significantly more favorable toward the course than were ITV students, there were no significant differences between attitude scores of face-to-face and ITV students. Five questions were designed to measure students' motivation. For one question, "looked for excuse to miss class," a significantly higher percentage of ITV students responded more unfavorably than face-to-face students, for two courses. For another question, "considering vocation in the area," ITV students in one course responded significantly more favorably than face-to-face students, and exactly reverse responses were obtained in another course. ITV students had significantly lower scores on the instructor attitude instrument than face-to-face students for two courses. Students tended to prefer small face-to-face classes over ITV classes. ITV students' attitudes toward ITV became more unfavorable over a period of time. Students' reactions toward ITV were more variable than reactions toward face-to-face classes. Attitudes toward presentation method were independent of ability, and students tended to regard the instructor variable as being more important than the method of presentation variable.

Instructors rated teaching environment features on five-point rating scales, and compared face-to-face teaching with ITV. Teachers regarded

ITV as a helpful aid rather than an end in itself. They felt ITV and face-to-face instruction were equal regarding the teacher's ability to animate his presentations, to make an impression on students' attitudes, and to cover the course content. Teachers felt that students learned as well in ITV as in face-to-face courses, and felt that course objectives were covered at least as well if not better in ITV sections than in large—but not small—face-to-face sections.

193. MARTIN, HOWARD S. "The relative effectiveness of teaching dramatic understanding and appreciation as compared to conventional classroom instruction." Lincoln: University of Nebraska, KUON–TV, and the Nebraska Council for Educational Television, 1961. NAEB Research Fact Sheet, Series I, 102, *NAEB Journal* 21 (1962), 1–7. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: 186 high school students.

Subject taught: Modern American drama.

Key variables: TV teaching, face-to-face teaching, California Reading Test scores.

Two groups of 94 students each were matched on the basis of age, sex, intelligence, and reading ability. One group was taught dramatic appreciation of the play *Our Town* by Thornton Wilder by reading the play and discussing it with their teacher in a face-to-face situation as written dramatic literature. The other group was taught the same written dramatic appreciation, but also saw several scenes from the play dramatized as part of a TV method of instruction. Student achievement was evaluated by administering a 91-item questionnaire to both groups.

The first three parts of the questionnaire covered each act of the play. The first seven questions for each part covered the dramatized scenes, the next seven questions tested recall of specific events in the dramatized scenes, and the last seven questions covered material in the scenes not dramatized. Part IV of the questionnaire tested students' appreciation of the dramatic point of the play. Questions were secured in part from a standardized test on the play and augmented by consultations with several English teachers in the schools. The results of the questionnaires were analyzed by chi-square technique for students categorized by method of instruction, sex, and intelligence.

Results.—(1) Students taught by TV dramatization did significantly better than students taught by face-to-face methods of instruction. (2) There was no significant difference between methods of instruction for recall of scenes not dramatized. (3) There was no significant difference between methods of instruction for recall of scenes that were dramatized. (4) Students who were taught by televised dramatizations had significantly different appreciations of the play than did students taught face-to-face. (5) Students taught by TV tended to choose dramatized scenes to illustrate answers to essay questions more than students taught face-to-face.

The author concludes that dramatized scenes stand out more vividly for students than do scenes read as written literature. TV appears to be an equally effective means of instruction compared to face-to-face instruction for teaching specific events within the play.

194. MAY, MARK A., and NELLE LEE JENKINSON. "Developing interest in reading with film." *Audio-Visual Communication Review* 1 (1953), 159–166.

Problem: Determine effectiveness in inciting students to read from a regular and a motivating film.

Sample: 480 freshmen students in 26 classes.

Subject taught: *Kidnapped.*

Key variables: Regular and motivating film presentation, learning, reading as result of film.

Students who had never read *Kidnapped* or seen the movie or read a comic book of it were divided into regular film (28 minutes) and motivational film (18 minutes) groups. The first of these was the control group; the second, the experimental. Groups were matched on IQ scores, Iowa Reading Test scores, sex, number, and meeting before or after lunch. Four weeks after the viewing, students took an objective pop test on *Kidnapped.* Also available were records of students who had checked the book out and the students' report on how much they had read.

More pupils in the experimental group checked out the book from the library (.05 level). There were no differences between the number of students who had checked the book out and who indicated they read at least half or more of it. However, the control group regularly got higher scores on the objective instrument than the experimental group. This may be due to the control film being longer and providing answers to several test items.

It was concluded that film producers might encourage more reading if they produced motivational rather than story-telling films.

195. McCLARTY, EDWARD LEON. "Auding ability related to achievement in two telecourses." *Dissertation Abstracts* 18 (1958), 531.

Problem: Determine the relationship between auding and achievement.

Sample: College freshmen and sophomores.

Subjects taught: Economics and psychology.

Key variables: Auding, achievement; face-to-face and ITV presentation.

Achievement was determined by gains on criterion tests and course grades.

No significant relationship was found between auding ability and gains on criterion tests for any situation.

An auding-grades relationship (.05 level) was found for ITV at-home students in economics, and for all sections of economics combined (.001 level). All psychology sections combined yielded an auding-grades *r* significant at the .02 level.

196. McELROY, CLYDE W. "An experimental study to determine the effect of motion pictures in reinforcing instruction for the improvement of speaking techniques of students in beginning public speaking classes." *Dissertation Abstracts* 19 (1959), 2296.

Problem: Determine the effectiveness of films as reinforcement.

Sample: 53 speech students.

Subject taught: Public speaking.

Key variables: Learning; face-to-face and filmed instruction.

Students were in experimental or control classes. The groups were similar in sex, age, year in school, and state of residence. The same instructor taught both groups. For each of the five films, the experimental group had discussion before and after the films. The face-to-face group had lectures on comparable material. Three judges ranked the first and last speeches of all students on a 7-point scale on content, organization, delivery, style, and general effectiveness. At the end of the experiment, students in the experimental group ranked the films in order of effectiveness and interest, and filled out an attitude toward the films questionnaire.

Analysis of variance indicated no significant differences in speech improvement on the content, organization, delivery, style, and general effectiveness scales between the two groups.

Students indicated they felt the films were a helpful teaching device.

197. McGRANE, J. F., and MORTON L. BARON. "A comparison of learning resulting from motion picture projector and closed circuit television presentations." *Society of Motion Picture and Television Engineers Journal* 68 (1959), 824–827.

Problem: Comparative learning effectiveness of film projector in classroom presentation and TV presentation of same film.

Sample: 150 students.

Subject taught: Electricity (capacitance, alternating current, and inductance).

Key variables: Projector in classroom, TV monitor in classroom, learning, ambient noise level.

Six groups of students, 25 in a group, were selected to receive instruction from three films about electricity. Three groups saw the films from a projector in the classroom and the other three groups saw the film over a TV system with a monitor in the classroom. Each of the film projector groups saw the film with different ambient noise levels from the projector. The ambient noise level in the TV groups was constant.

A pretest instrument was given to measure student knowledge of the material in the films before instruction. There was no significant difference between or within groups on the pretest. The same test was given as a posttest after instruction to measure learning.

Results.—Using analysis of variance technique, the authors found two significant differences. Students in the two film projector-taught groups with the highest ambient noise levels learned significantly less than the lowest ambient noise level film projector group and all the TV-taught groups. The authors attribute this loss in learning to the interference of ambient noise with understanding the sound portion of the instructional films.

Conclusions.—At the lowest noise level, the projector group was superior to the TV groups because the TV screen was monochrome and the film in color, TV had lower resolution, and might be associated with entertainment and not education. At the middle-noise level for the film projector group, there was no significant difference in learning between TV and film projector presentations. When the noise level of the projector group was highest, TV instruction was superior.

198. MCINTYRE, CHARLES J. Training film evaluation: *FB 254—Cold Weather Uniforms.* Technical Report SDC 269-7-51. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1954.

Problem: Effectiveness of humorous elements in teaching skills from a training film.

Sample: 426 trainees at Aberdeen, Maryland Proving Ground.

Subject taught: Cold weather uniforms.

Key variables: Film with humorous treatment, film without humorous treatment, learning, opinion questionnaire, intelligence test.

A film with a humorous treatment was used to teach proper wearing of cold weather gear. Two other versions of this same film were prepared for this experiment. One version substituted blank leader for the humor segments and the other added main titles and subheadings in place of the humor segments. Six experimental groups of recruits were chosen at random from the test sample. Four of these groups were used as (1) a control group to take a content test but not to see any film, (2) a base film group to see the humorous film and take the content test, (3) a titles group to see film with titles substituted for humor and to take the test, and (4) a no titles group to see film with blank leader substituted for humor and to take the content test.

The remaining two groups saw different versions of the films in different order and were also given an opinion questionnaire to determine their subjective evaluation of the films. One group saw the base version first and then the titles version of the film and the other group saw the titles version first followed by the base version. No comparison was made between the no titles version and the other versions because the group to be used for this test was unavailable at the time of testing.

Results.—The scores on the information test for the first four groups and the significance of the difference between groups is shown in the following table:

Treatment	*Adjusted mean score*
Base version	37.72
Titles version	39.91
No titles version	35.99
Control	25.76

Comparison	*t-test*	*p*
Base-control	9.18	.01
Title-base	2.03	.05
Titles-no titles	3.60	.01
Base-no titles	1.63	NSD

Conclusions.—Author states that (1) films did teach how to wear cold weather uniforms, (2) trainees learned significantly more from film with titles than film with humorous approach, (3) trainees learned significantly more from film with titles than from film with no titles, and (4) trainees did not learn more from nontitled versions than from the humorous version.

Trainees learned more when humor was replaced with titles. Trainees preferred the film they saw last, in the two groups which saw two films, because the second showing was a restatement of the earlier version and therefore easier to understand.

199. MCINTYRE, KENNETH M. *A study to determine specific sources of resistance to the use of audio-visual materials by college and university teachers and the development of procedures for overcoming the*

barriers to optimum use. USOE Grant No. 731052. Chapel Hill: University of North Carolina, 1963. (Offset).

Problem: Determine the faculty's attitudes to films, ITV, and other AV material.

Sample: 174 North Carolina faculty members.

Key variables: Attitudes and attitudes over time.

Faculty members filled out a 27-item Likert questionnaire in the spring of 1960 and the spring of 1961. Three of the six TV questions on the instrument showed a significant change: teachers were significantly more favorable on the pretest than posttest in believing teachers should receive royalties from ITV programs (.05 level), and feeling they did not understand all the implications involved in college ITV (.01 level). Teachers were significantly more favorable (.05 level) on the posttest than pretest in being willing to teach on TV in a TV studio.

During this study, the School of Dentistry produced a dental telecourse. The Dental School faculty had significantly higher scores than the rest of the university in every AV area investigated.

200. MCNIVEN, MALCOLM. Effects on learning of the perceived usefulness of the material to be learned. Technical Report SDC 269-7-54. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1955.

Problem: Effectiveness of motivation measured as perceived usefulness in learning from films.

Sample: 473 high school seniors.

Subjects taught: First-aid, atomic energy, automobile fundamentals.

Key variables: Information test, film ranking, student attitude, intelligence, instructions before films are shown.

Five groups of high school students were shown three films. Groups 1, 4, and 5 saw film on first-aid, group 2 saw film on atomic energy, and group 3 saw film on automobile fundamentals.

Temporal goal distance varied for the groups 1, 4, and 5 by telling them before they saw the film different dates on which they would be tested over the information in the film. Group 1 was told nothing about date for testing, group 4 was told they would have a test some time in the next two months, and group 5 was told they would be tested the day after the showing.

Psychological goal distance was measured by asking groups 1, 2, and 3 to rank the films in order of usefulness to them based on a brief description of the film read before showing the film. They were then assigned to see a film regardless of their ranking order of usefulness.

Design for the experiment was to (1) rank the films, (2) take information pretest, (3) see the film, (4) take an attitude scale measuring usefulness, (5) take information posttest and (6) take Otis IQ test. Information pretests and posttests were specially constructed multiple-choice tests. Students were asked to rank films for usefulness and interest.

Results.—Analysis of covariance technique was used to compare achievement. Posttest scores were adjusted for scores on Otis IQ test and information pretest. For groups 1, 4, and 5 there was a significant difference in learning because of temporal goal-distance differences. The nearer the goal for using the information the greater the learning.

Analysis of the psychological goal-distance differences for groups 1, 2, and 3 was achieved by correlation between the attitude scale scores, posttest scores, pretest scores, Otis IQ scores, and film ranks. Author concluded that the attitude of perceived usefulness was an important factor in learning from the film. Individuals who saw the film they ranked highest in usefulness learned relatively more from the film than those who saw the film but ranked it low in usefulness. Correlations between the attitude scale scores and film rankings were high because, the author said, they were measures of the same variable.

Conclusion.—The nearer the individual perceives himself to be to the use of information from a film, the greater will be the learning. [See Summary No. 102.]

201. MCTAVISH, CHESTER LYNN. "Effect of repetitive film presentations on learning." *Abstracts of Doctoral Disser-*

tations, The Pennsylvania State College, Vol. 16. State College: The Pennsylvania State College, 1954. p. 333–338.

Problem: Determine learning upon repeated film showings.

Sample: 319 college freshmen, 297 high school students taking chemistry, and 366 students in ninth-grade science.

Subjects taught: Electrochemistry, colloids, food and nutrition, atomic energy.

Key variables: Number of film viewings, learning.

Each of the three groups (ninth graders, seniors, and college freshmen) was divided into four groups. Each subgroup saw one film one time, one film twice, one three times, and one four times, in a Latin Square design. All students took a pre- and posttest content instrument for each of the four films. Raw scores on the instruments were changed to standard scores, since the instruments varied slightly in difficulty. Scores on the instruments given after the one-viewing treatment were added across films.

Mean differences between the pre- and posttest for one, two, three, or four viewings were all significant (.001 level). There was a significant increase in learning (mean gains) of two viewings over one viewing for all levels of students (.001 level). There was also an increase in learning (mean gain) of three viewings over two viewings (ranging from .01 level for college freshmen to .05 level for ninth-grade students). However, these mean gains were only one-fourth of the mean gains from one to two viewings. There was also an increase in learning (mean gain) of four viewings over three viewings for college freshmen and high school seniors, but these increases were not significant.

202. MEACHAM, ESTHER ANNE. "The relative effectiveness of face-to-face lecture versus instructional television in a college clothing course." *Dissertation Abstracts* 24 (1963), 276.

Problem: Determine the effectiveness of teaching a clothing course by ITV and face-to-face presentations.

Sample: 83 students.

Subject taught: Clothing: Principles of construction.

Key variables: Face-to-face and television presentation, learning performance.

The control group ($N=33$) had face-to-face presentation one quarter. The experimental group ($N=50$) had television presentation for 30 minutes followed by 18 minutes of discussion led by the television teacher for one quarter. Scores on the Ohio State Psychological Examination, grade point averages, and amount of previous experience in clothing construction were available for all students. Achievement was measured by a pre- and post-objective information test, performance test, choice-of-picture test, and the Graves Design Judgment Test. Also, a test on pattern alternation was given and an evaluation of laboratory performance was made.

Multiple-regression technique showed no significant differences between groups, except for the laboratory performance evaluations, which were higher for the experimental group (.05 level).

See also "Television in the clothing classroom." *Journal of Home Economics* 56 (1964), 89–94.

203. MEIERHENRY, W. C. "A study of teaching by television under two conditions." Lincoln: University of Nebraska, 1955. *Audio-Visual Communication Review* 6 (1958), 75–76. (Abstract).

Problem: Determine the effectiveness of television viewed in the classroom and at home.

Sample: 24 students.

Subject taught: Audio-visual materials for teachers.

Key variables: On-campus and at-home viewing; learning and attitudes.

Both groups of 12 students had 28 30-minute ITV presentations. The on-campus group had an additional 20 minutes in the classroom and an hour period of practice on equipment that the at-home group did not have.

There were no significant differences in final test scores between the two groups. The at-home group was more favorable toward ITV and did not miss the student-instructor relationship.

204. **MERCER, JOHN. Relationship of optical effects and film literacy to learning from instructional films. Technical Report SDC 269-7-34. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1952.**

Problem: To determine the instructional value of film production rhetorical devices.

Sample: 288 Air Force recruits, 684 Navy recruits.

Subjects taught: Air Force: *Hunting Animals of the Past;* Navy: *Oxygen Breathing Apparatus.*

Key variables: Film literacy, film optical effects, (fades, wipes, dissolves), Otis Test of Mental Ability, Navy General Classification Test.

Hypothesis to be investigated was that optical effects in instructional films would increase learning. To test this hypothesis, two groups of students were selected and the Otis Self-Administering Test of Mental Ability given to the Air Force group and the Navy General Classification Test given to the Navy group.

The Air Force students were separated into two groups. One group received a lecture on film optical effects and then given a test of film literacy. The other group did not receive instruction in film optical effects, but was given the film literacy test to serve as a control group. Both groups were then shown the film *Hunting Animals of the Past.* A test of film content was then given to all students (K-R #21 $r=.67$).

The Navy group was separated into two groups. One half was given the optical effects lecture and the film literacy test. The other group was not given the optical effects lecture, but was given the film literacy test as a control. Both groups saw the film *Oxygen Breathing Apparatus* and given a test on the film content.

Three versions of each film were constructed. Version A had no optical effects, using only cuts between scenes. Version B used the principal intersequential optical effects and Version C used all the optical effects. Each group was divided into three sections which saw one of the three versions of the film.

Results.—The results of the studies, using analysis of covariance with adjustment for intelligence, were tabulated as follows:

Mean Adjusted Scores

Study	*Instruction*	*Version A No effects*	*Version B Principal effects*	*Version C All effects*	*Total group*
Air Force	Lecture on film effects	35.76	37.24	36.50	36.08
	No lecture	36.84	35.76	37.58	37.17
	Total group	36.30	36.53	37.04	36.23
Navy	Lecture on film effects	22.16	22.72	22.13	22.34
	No lecture	24.14	23.10	22.96	23.40
	Total group	23.15	22.91	22.54	22.87

Analysis of Covariance

	df	*Mean square*	*F*	*p*
Air Force				
Optical effects	2	13.76	.3261	>.05
Lecture	1	84.50	2.008	>.05
Optical v. lecture	2	142.5902	3.3797	>.05
Within groups	282	42.1903	-----	----
Total	287	-------	-----	----
Navy				
Optical effects	2	115.0240	2.1479	>.05
Lecture	1	54.211	–1.0122	>.05
Optical v. lecture	2	97.2175	1.8154	>.05
Within groups	678	53.5526	-----	----
Total	683	-----	-----	----

205. MERRILL, IRVING R. "Attitude films and attitude change." *Audio-Visual Communication Review* 10 (1962), 3–13.

Problem: To test hypotheses of the effects of an attitude film, an information film, and a nonrelated (control) film on attitudes about safe driving.

Sample: 181 male Navy reservists, each having one or more years of automobile driving experience.

Subjects taught: Safe driving and the effect of communism in China (control).

Key variables: Salience, cognitive change, affect, and rigidity.

The flexibility scale of the California Psychological Inventory, a test of salience and cognitive change, and a test of affect (Scale of Social Values) were given 181 subjects, who were then divided into six rigid and six flexible groups. One month later, equal numbers of groups viewed one of three 28-minute films (attitude, information, and a control film). Three rigid and three flexible groups took immediate posttests of salience and cognitive change, and of affect; the six other groups took 10-week delayed posttests.

Support was found for the hypotheses that the initial effect of the attitude film is manipulation of the cognitive, not the affective, component of attitude and that defensive avoidance occurs when strong fears are aroused by the attitude film because of its dramatic form. Rigid and flexible groups did not differ on any of the measures.

206. MERRILL, IRVING R., and HILDRETH H. MCASHAN. "Predicting learning, attitude shift, and skill improvement from a traffic safety film." *Audio-Visual Communication Review* 8 (1960), 263–274.

Problem: Determine learning, retention, and attitude change from a film.

Sample: 165 sophomores, juniors and seniors at Michigan State University, each with one or more years of driving experience.

Subject taught: Driving at night.

Key variables: Learning, retention, performance, attitude change, attitude change over time, viewing related and nonrelated films.

Subjects saw either a driving-at-night film (experimental group) or a nonrelated film (control group). Subjects took a 40-item multiple-choice test, a semantic differential instrument with seven concepts, and a performance test involving driving at night, during which nine situations presented in the film were encountered by the subject.

Agreement of subject matter and film-production specialists' predictions of which message elements would produce learning and attitude change (immediate and after 6 weeks) were generally significantly greater than chance (.05 level).

Students in the experimental group had significantly higher scores (.05 level) on the multiple-choice test than the control group, on both immediate and delayed tests. No significant shifts in attitude occurred immediately after the viewing, as determined from scores on the semantic differential. Two significant (.05 level) shifts occurred at the 6-week testing (for concepts night driving skill and night driving fatigue).

There were no gains reported in driving skill, immediate or delayed, for any of the items included in the road test.

The two panels failed to predict accurately which items actually produced greatest or least learning and attitude change.

207. MICHAEL, DONALD N., and NATHAN MACCOBY. "Factors influencing verbal learning from films under varying conditions of audience participation." *Journal of Experimental Psychology* 46 (1953), 411–418.

Problem: Relative contributions of practice and motivation in learning from films.

Sample: 1,029 high school students.

Subject taught: Civilian defense against atomic bombing.

Key variables: Practice vs. motivation as contributors to audience participation effects in learning from films, overt vs. covert participation, practice effects and the effects of knowledge of results.

Previous research has shown that more learning from films occurs when the viewer is required to take part in an "audience participation" procedure than when he is not. This increased learning might be the result of increased practice during the participation periods, and/or increased motivation to learn arising from participation. The chief purpose of this experiment was to assess the relative contributions of practice and motivation factors to the increased teaching efficiency of film showings using a participation procedure. In addition, three experimental conditions were studied that were expected to affect the level of learning.

Participation conditions

Participation occurred during practice periods alternated with sections of the film, and required the audience to answer questions asked on the content of the previous section of the film. Subjects participated by trying to answer the questions, some by writing the answers (overt practice) and some by just "thinking" them (covert practice). Under each of these conditions, half of the classes were told the correct answers after they had tried to answer the questions themselves, and half were not. Half of the classes under each pair of these conditions were told before the film began that they would be tested afterward; the other classes were not. Control groups consisted of subjects who were given the test questions but not the film, and subjects who saw the film straight through without participation (half of whom were warned they would be tested on the film content, and half of whom were not warned).

Findings

1. Within the limitations implicit in this experiment, audience participation procedures utilizing either overt or covert practice, when the participants had knowledge of the correct responses (KCR), were found to result in considerable improvement in the learning of verbal material over that resulting from simply viewing the film. Even without the provision of the correct response, participation appears to result in better performance than no participation. This increase in learning seems to be due primarily to the effects of practice and not to the effects of changes in motivation to learn.

2. The most important factor influencing the amount of learning in this experiment was the provision of knowledge of the correct response after practice (KCR). This applies to both overt- and covert-practice conditions, and to both the more intelligent and less intelligent participants.

3. There was no significant difference between the level of learning achieved with overt practice as compared to covert practice. An unsuccessful attempt was made to provide two levels of extrinsic motivation by informing some subjects of a test to follow the film, and not informing others; no significant differences were found.

208. MILLER, J., S. LEVINE, and J. KANNER. "A study of the effects of different types of review and of structuring subtitles on the amount learned from a training film." Memo Report No. 17. Human Resources Research Laboratories, Bolling AFB, Washington, D. C., March 1952. *Audio-Visual Communication Review* 1 (1953), 140. (Abstract).

Problem: Determine the relative effectiveness of a film which spaces reviews throughout with a film that masses the reviews at the end, and determine the effectiveness of subtitles in structuring the film into units.

Sample: 1,263 high school students.

Subject taught: Elementary electricity.

Key variables: No review, spaced review, massed review at the end, spaced oral review (sound track only); no subtitles, five subtitles, five major and 21 minor subtitles; learning.

Each of the four review treatments was divided into the three subtitle treatments. Each of the 12 resulting presentations was shown to three high school classes. Students took pre- and posttests.

There were no significant differences between levels of learning in the subtitle treatments. Massed review treatments produced significantly greater learning than spaced or no review. The posttest scores for the spaced, no, and oral-only review groups were about the same.

209. MINTER, PHILIP C., FRITZ A. ALBERT, and RICHARD D. POWERS. "Does presentation method influence film learn-

ing?" *Audio-Visual Communication Review* 9 (1961), 195–200.

Problem: Determine learning from films with various presentations.

Sample: 185 girls in seventh-grade sewing classes in six Madison, Wisconsin, schools.

Subject taught: Aspects of sewing.

Key variables: Presentation method, learning, interest, ability, order.

Four 8- to 10-minute films were made of different topics of comparable difficulty. One treatment was showing a film continuously, another treatment was stopping a film to allow for rest periods for the pupils, the third was splicing written questions and statements into the film, and the fourth was periodically stopping so that the instructor could question the pupils, and so they could take notes. All girls saw four films, one of each treatment in a Graeco-Latin square design. Films were shown a week apart. All pupils took an objective test immediately after each film. The girls also filled out a questionnaire on interest in sewing and the California Mental Maturity Index.

Pupils who had low interest in sewing had significantly higher scores (.05 level) in the discussion-note-taking treatment than in the other three treatments. The higher-ability pupils also had significantly higher scores (.05 level) in the discussion-note-taking treatment than in other treatments. There were no significant differences among interested pupils and among low-ability pupils for any of the presentation treatments. Pupils tended to learn more from the third film that they viewed.

210. MITCHELL, CLIF. *Report of the educational television project, third year: 1959–1960 in the Dade County (Greater Miami), Florida public schools.* Miami: Dade County Public Schools, July 1960. (Offset).

Problem: Determine the relative effectiveness of face-to-face and ITV instruction.

Sample: See below.

Subjects taught: Science, history, English, and biology.

Key variables: Face-to-face and ITV presentation; achievement.

Sixty-seven ITV students and 65 face-to-face students in the sixth grade took paragraph meaning, word meaning, spelling, language, arithmetic reasoning, and arithmetic computation tests before and after the course. Analysis of covariance controlling on initial achievement scores indicated that 6 of a possible 18 comparisons between face-to-face and ITV students in three sections had significant differences, 4 of which were in favor of the control group.

In the seventh grade, 176 ITV students and 63 face-to-face students took a science instrument before and after the course. Analysis of covariance indicated no significant differences in test scores between the two groups.

In the eighth grade, 159 ITV students and 69 face-to-face students took a world history test before and after the course. Analysis of covariance indicated no significant differences in test scores between the two groups.

In the tenth grade, 140 ITV students and 86 face-to-face students took an English instrument before and after the course. Analysis of covariance indicated no significant differences in test scores between the two groups.

In the tenth grade, 76 ITV students and 86 face-to-face students took a biology instrument before and after the course. Analysis of covariance indicated no significant differences in test scores between the two groups.

In the eleventh grade, 136 ITV students and 69 face-to-face students took an American history instrument before and after the course. Analysis of covariance indicated that experimental students' scores on the instrument were significantly greater than control group students.

Students in both ITV and face-to-face classes were generally matched on age and either IQ or SCAT scores.

211. MOLDSTAD, JOHN. "Readability formulas and film grade-placement." *Audio-Visual Communication Review* 3 (1955), 99–108.

Problem: Determine the relative effectiveness of difficult, medium, and simple film narrations on learning.

Sample: 255 seventh-grade pupils in a Bloomington high school.

Subject taught: Life of a plant.

Key variables: Narration difficulty level, learning.

Three prints of the same film were made and a magnetic sound stripe was put on each one. Three levels (fifth, seventh, and eleventh grades) of narration for the film were developed, using the Dale-Chall readability formula.

Pupils were divided into three groups. All took a pretest over the content of the film and on science vocabulary. (The most difficult narration level had the highest number of difficult science words in the vocabulary test.) Each group then saw one of the three films, and took the posttest 24 hours later. Scores on the Cooperative English Test were also available for all students. Analysis of variance run on the scores of the posttests showed no significant differences among treatments on learning science facts or vocabulary. Students' scores in all groups were significantly higher on the posttest than on the pretest.

212. MORGAN, JAMES DONALD. "An investigation of pupil achievement by objective tests in the Washington County closed-circuit television project." *Dissertation Abstracts* 23 (1963), 4576.

Problem: Determine if pupil achievement increased with successive years of ITV.

Sample: Pupils in Washington County.

Key variables: Length of ITV instruction, televised and face-to-face presentation, and learning.

Pupils of generally urban background who made average scores or higher in arithmetic achieved an average of 2 months higher over a 4-year period than pupils in face-to-face classes. Pupils of generally rural background who made below average scores in arithmetic achieved an average of 4 months higher than pupils in face-to-face classes.

This same pattern tended to persevere slightly less with pupils in junior and senior high schools.

Differences among groups having one year of ITV were not usually significant.

213. MULLIN, DANIEL W. "Retention as a function of motivation and environment in educational television on the secondary school level." *Speech Monographs* 23 (1956), 118–119. (Abstract of doctoral dissertation.)

Problem: Determine the effect of motivation and environment.

Sample: Eleventh-grade students.

Subject taught: Explorations in space.

Key variables: Motivation, environment, learning, retention.

Eleventh graders coming from families of average or above-average income were divided into two groups, motivated (promise of monetary reward) and unmotivated (no reward). Half of each group saw the program in their home; half in the schoolroom. (Two other groups were "casual" viewers and nonviewers.)

Analysis of a recall instrument administered 24 hours after the telecast and 2 weeks afterwards revealed that scores of motivated students were higher than scores of unmotivated students (.01 level) for both immediate and delayed posttests. There were no differences in retention due to environment. Mean scores suggest that the unmotivated viewer may learn more in the classroom and the motivated viewer may learn more at home.

214. MUNTONE, JOHN CHRISTOPHER. "The effects of variables in instructional television on acquisition of information and attitudes." *Dissertation Abstracts* 23 (1963), 4264–4265.

Problem: Determine the effects of permissive and authoritarian ITV panel discussions on information and attitudes.

Sample: About 800 sophomore students.

Subject taught: Air science.

Key variables: Permissive and authoritarian panel discussion, learning, attitude.

The control group received televised lectures and the experimental group received televised panel discussions. Members of the experimental group saw both authoritarian and permissive panel discussions. All students took an information instrument before and after each of the two presentations that the experiment covered.

A semantic differential instrument and attitude checklists were administered with the posttest.

Permissive subgroups had significantly greater mean gains in information and attitude than did authoritarian subgroups. For one week, the permissive, two-camera subgroup had higher scores on all measures than any other group. No relationship was found between the method of instruction and information gain.

215. MURPHY, FRANCIS EUGENE. "The relative effectiveness of filmed introductions to a general science motion picture." *Dissertation Abstracts* 22 (1962), 3121.

Problem: Determine the relative effectiveness of various introductions to a film.

Sample: 271 seventh-grade students.

Subject taught: Learning about light.

Key variables: Introduction, learning, retention, ability, sex.

Students were randomly assigned to one of five groups: (1) received the technical vocabulary in the film as an introduction, a description of the film and its purpose, and a set of questions directed at the concepts in the film, (2) received description and vocabulary only, (3) received description only, (4) had no introduction (film only), and (5) had no film or introduction. All students took a 72-item test (K-R r=.94) to measure learning from the film immediately and after 4 weeks.

All film groups' scores were significantly higher than the nonfilm group, but there were no significant differences among the three introduction treatment groups or the film-only group. Generally there were no clear-cut significant differences between sexes. Students in groups (1) and (2) having a K-A IQ between 90–110 had significantly higher scores than similar ability students in the film-only group. There were no significant differences among treatment groups for high-ability students. Students in all film treatments had higher retention as measured by test and retest scores 4 weeks later.

216. MYERS, LAWRENCE, JR. *An experimental study of the influence of the experienced teacher on television.* Syracuse, N. Y.: Syracuse University, 1961.

Problem: Determine the relative effectiveness of experienced and substitute teachers.

Sample: 84 college students at Syracuse.

Subject taught: Four topics on broadcasting.

Key variables: Experienced (10 years teaching) and nonexperienced teachers; kinescope and face-to-face presentation.

Four sets of experienced and nonexperienced teachers each taught a broadcasting topic to college students. The same instructor taught a kinescope and a face-to-face section. Students were randomly assigned to face-to-face or kinescope presentations. After each lecture, and at the end of the course, students took tests involving multiple-choice items and essay questions. Students also completed several semantic differential scales relating to teacher traits and a Likert scale of attitude towards broadcasting.

Analysis of variance and t-tests indicated no significant differences in the content scores of students in lectures of experienced or nonexperienced teachers. Experienced teachers seemed to be more effective in teaching critical thinking. Experienced teachers were rated significantly more authoritative, brilliant, confident, relaxed, profound, inspiring, definite, and effective.

There were no significant differences in content scores of students in the television or face-to-face treatments. Face-to-face teachers were often rated significantly higher on activity and potency adjectives. Generally there were no significant differences between activity and potency ratings of experienced television teachers and nonexperienced face-to-face teachers. Students rated the concept Teaching by Television as significantly more profound, authoritative, clear, intimate, personal, and easy to take notes on the posttest than on the pretest.

217. NEALE, DANIEL CHRISTOPHER. "Observation by closed circuit television, kinescope, and classroom visitation in an introductory education course." *Dissertation Abstracts* 22 (1961), 1915–1916.

Problem: Determine the relative effectiveness of direct observation, television and kinescope observation, and determine the effect of size of viewing group.

Sample: 258 college students in fall 1960 and 114 students in winter 1961.

Subject taught: Observation.

Key variables: Direct television and kinescope observation; size of viewing group.

Students were assigned to one of the three treatment variables. Teachers were rotated through treatment groups to balance individual effects.

Students took the Minnesota Teacher Attitude Inventory, course exams, a test of attitude toward the teaching profession, and ratings of the course and of the lab sections.

Lecture hour observers rated their experiences significantly higher than did students receiving the lecture. Those who had direct observation rated their observation experience significantly higher than those who observed by television or kinescope, and those observing by television rated their experience higher than those observing by kinescope. There were no significant differences in observation ratings by students in small or large classes.

218. **NEARING, CHARLES LYNN.** "The use of kinescope recordings for observation of classroom situations in a beginning teacher training course." *Dissertation Abstracts* 23 (1962), 1282.

Problem: Determine the effectiveness of observation by kinescopes and by classroom visits.

Sample: 418 students in a teacher-education course at Michigan State University.

Subject taught: Teacher-education observation.

Key variables: Kinescope and classroom observation, course instructor, time of day, MTAI scores, attitudes toward course and toward education.

All students took the MTAI, a misconception of education scale, a course evaluation scale, an evaluation of observation experiences scale, and a career plans questionnaire. In addition, course grades were available for all students. Half of the students saw a 2-hour program of observation kinescopes; half visited classrooms for 5 hours. There were no significant differences between groups on any of the six measures except for the career plans questionnaire and the evaluation of observation experiences scale. Students in the kinescope section scored higher on the former instrument and students making classroom visits scored higher on the latter. Thus there was little difference between kinescope and actual visit treatments.

Scores on the MTAI, career, and course evaluation scales varied with the instructor.

Students taking afternoon sections had significantly higher course grades.

219. "The Nebraska experimental program in the use of television and correspondence study, 1957–58." Lincoln: University of Nebraska. *Audio-Visual Communication Review* 8 (1960), 240. (Abstract).

Problem: Determine the relative effectiveness of television and correspondence study with face-to-face presentation.

Sample: 691 television and correspondence students and several thousand face-to-face students in large and small high schools.

Subjects taught: Algebra, literature, general mathematics, physics, geometry, English, and Spanish.

Key variables: Learning; face-to-face and ITV presentation.

Achievement in algebra, literature, and general mathematics was about the same for the face-to-face and television groups. On one of two final physics tests the large high school control group had somewhat higher scores than the other. The large high school control group was significantly more favorable for teaching geometry and English mechanics. Both control groups exceeded the ITV group in Spanish.

220. **NEIDT, CHARLES O., and JOSEPH L. FRENCH.** *Reaction of High School Students to Television Teachers.* Lincoln: University of Nebraska, 1958.

Problem: Evaluate differential reaction of students to teachers when classes are taught by television-correspondence and face-to-face methods of instruction.

Sample: 68 students.

Subjects taught: English and geometry.

Key variables: Student Expectation Scale, course ranking, Purdue Rating Scale for Instruction, attitude toward method scale, attitude toward subject scale, attitude toward teacher, semantic differential scale, activities participation scale, Wood Behavior Preference Record, and individual interviews.

An experiment involving the same two groups of high school students and teachers was designed. Two groups of high school students enrolled in plane geometry and two groups enrolled in senior English experienced one semester of television-correspondence instruction and one semester of face-to-face instruction by the same teacher in counterbalanced order. This study was part of the *Nebraska In-School Television-Correspondence Study Program* whose purpose was to determine the most effective combination of correspondence study and television for high schools.

Students experienced instruction according to the following design:

TV-correspondence

First semester
  English—at Waverly
  Geometry—at Waverly

Second semester
  English—at Crete
  Geometry—at Valparaiso

Face-to-face

First semester
  English—at Crete
  Geometry—at Valparaiso

Second semester
  English—at Waverly
  Geometry—at Waverly

There were 26 students enrolled in senior English at Crete and 13 at Waverly. Fifteen students were enrolled in plane geometry at Valparaiso and 22 at Waverly. The two teachers made daily trips to the school to provide face-to-face instruction. TV classes viewed lessons broadcast from KUON-TV, Lincoln, Nebraska.

Summary of Results

Student Expectation Scale.—Students enrolled in both classes felt the teacher fitted their conception of "ideal" equally well when instruction was experienced by face-to-face and TV.

Ranking of courses.—Instruction method in geometry did not significantly alter the student ranking of the course according to how well they liked the course. Students taught English by face-to-face method ranked course significantly higher (.01 level) than students taught English by TV.

Purdue Rating Scale for Instruction.—Students felt the English teacher showed a more liberal attitude and the presentation of subject matter was more effective in face-to-face than TV instruction. Combining the 10 individual characteristics produced a significant difference favoring face-to-face instruction. None of the individual nor the combined characteristics for the geometry class was significant.

Attitude scales.—Three Likert-type attitude scales were used to measure attitude toward (1) method of instruction, (2) course, and (3) teacher.

English students reflected a significantly more favorable attitude toward methods when the course was taught face-to-face. They were more favorable toward the subject matter when taught face-to-face. The English students also reflected a significantly more favorable attitude toward the teacher during face-to-face instruction.

Geometry students held a significantly more favorable attitude toward methods during face-to-face instruction. There was no significant difference between the two conditions of course and teacher.

Semantic differential responses.—English students perceived the teacher differently under two instructional conditions on six characteristics. In the face-to-face situations, the English students perceived their teacher as more talkative, interesting, relaxed, organized, and humorous. The students perceived their teacher as being more polished in the TV situation. There were no significantly different perceptions for the geometry students in either situation.

Activities participation scale.—Students were asked to rate their teacher with respect to how well they would like to have their teacher participate in activities with them. English students preferred to have their face-to-face teacher as a class sponsor. The mean score for the English teacher was significantly higher for the face-to-face situation than for the TV situation. There was no significant difference in preference in the geometry class for either situation.

Wood Behavior Preference Record.—The WBPR was administered in different forms to each group at the beginning and end of each semester. For the English students, significant changes in "cooperation," "integrity," and "responsibility" resulted in the face-to-face situation. In the TV situation, significant changes in "leadership," "friendship," and "critical thinking" resulted.

For the geometry class, significant changes for the face-to-face situation were found for "integrity" and "responsibility." Significant changes were found for the TV situation in "leadership" and "critical thinking."

Interview responses.—Interviews, recorded on tape, were held at the end of the first semester with those students who were taught by TV and at the end of the year for all students. The results are tabulated in two forms:

1. End-of-year summaries classified by individual questions.
2. Repeated interview summaries classified by individual questions.

Summary of Conclusions

The authors summarize: "Although high school students prefer conventional instruction, it is not because they perceive the characteristics of the teacher differently in the two situations, but because of factors inherent in the instructional television situation." The authors also state the most influential factor contributing to unfavorable attitudes toward television instruction is a lack of intercommunication between students and teachers.

221. NELSON, COURTENAY M. "Effectiveness of sound motion pictures in teaching a unit on sulphur in high school chemistry." *School Science and Mathematics* 52 (1952), 8–10.

Problem: Comparative effectiveness of film and face-to-face teaching.

Sample: 39 high school students.

Subject taught: Chemistry.

Key variables: Learning, film teaching, face-to-face teaching.

During March 1951, one class of students ($N=17$) was taught a chemistry unit on sulphur by face-to-face methods of instruction. A similar group of students ($N=22$) was taught the same material by seeing two films on sulphur, sulphur mining, and sulphur compounds. On the 2 days the film was shown to the film group, the face-to-face group received instruction in the materials covered in the film. The sulphur unit lasted 2 weeks. During this time both groups received the same instruction in chemistry: the only variable was the 2 days of film viewing and face-to-face discussion about sulphur. At the end of the unit a comprehensive examination was given to both groups. The same test was repeated 5 weeks later to measure retention.

Test and retest data were analyzed by analysis of covariance adjusting for (1) total grade-point average of freshman and sophomore courses; (2) IQ from California Test of Mental Maturity. and (3) scores from previous chemistry tests. Significant differences were found for the comparison of the end test which favored the film-taught group and for the retention test which also favored the film-taught group. The amount of loss for both groups from test to retest was not significant when compared on basis of instructional methods.

The author concludes that instructional films are a useful tool for teaching chemistry units to high school students.

222. NELSON, HAROLD. "The use of closed circuit television in teaching the basic course in speech." *The Speech Teacher* 7 (1958), 1–5.

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: 117 TV taught, 181 face-to-face taught.

Subject taught: Basic speech.

Key variables: Learning, TV teaching, face-to-face teaching, student opinion, teacher opinion.

Two groups of students were taught basic speech. One group of six sections was taught by closed-circuit television with three sections supervised by full-time faculty members and three sections supervised by graduate assistants. The other group of six sections was taught face-to-face. Lectures for the TV sections were presented to all TV sections by a member of the full-time staff. Supervisors of the TV sections used the TV facilities to demonstrate speech methods and to allow students an opportunity to demonstrate their speaking ability to other classes. One of the TV sections was taught in a "democratic" manner by a student from the class serving as chairman with textual assignments made from a syllabus prepared by the instructor. Standards of performance were established by the instructor. Students were then allowed to reach goals without direct supervision. The instructor viewed class sessions by television to determine ability to supervise a speech class from a remote location. A part of this study was to also measure the effectiveness of allowing students to adapt speeches to an audience of students only. Students from other TV sections were regularly assigned performance speeches on TV so other sections could observe their progress.

Results.—Achievement was measured by comparing the percent of speech students receiving grades of A to F for methods of instruction. These grades were distributed as follows:

Instruction	*Number*	*Percent receiving grades*				
		A	*B*	*C*	*D*	*F*
TV	117	3.4	29.0	60.7	6.0	0.9
Face-to-face	181	2.8	27.6	62.4	5.5	1.7

A total of 62 percent of the students taught by TV approved of TV as a means of instruction and 21 percent disapproved of TV as a means of instruction. Instructors were in favor of the TV teaching and reported a shift in student attitude from negative to positive toward TV as means of instruction by the end of the semester. Students in the instructor-less classroom were generally in favor of continuing this type of instruction and would enroll in a course taught the same way next semester.

223. NELSON, H. E., and A. W. VANDERMEER. Relative effectiveness of differing commentaries in an animated film on elementary meteorology. Technical Report SDC 269–7–43. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1955.

Problem: Effectiveness of improving language intelligibility of film narrations.

Sample: 291 students.

Subject taught: Meteorology.

Key variables: Learning, basic film, film with narration's intelligibility improved.

Four versions of an instructional film on meteorology were produced. The first version was similar to the original version from the producers, but the sound track was recorded by a meteorologist instead of the professional announcer previously used. The second version used personalized commentary with a simpler and smoother reading language. The third version used vivid descriptive words, common similes, and a personalized narration. The fourth version emphasized the visual elements of the film in the narration.

Two tests of learning were constructed: (1) a 64-item multiple-choice information test and (2) a diagram test in which the student chose the correct diagram from several possible choices. (K–R reliabilities for Test I for each version were .91, .83, .86, and .86 respectively. K–R reliabilities for Test II for each film version were .84, .78, .83, and .63 respectively.)

Ten sections of 529 men enrolled in Air Force ROTC were used as subjects. Mean scores on ACE Psychological Examination for College Freshmen ranged from 119 to 126 for the subjects. After equating scores on the ACE examination for experimental and control groups, and eliminating students with prior instruction in the subject taught, 219 students remained. Each group of students was shown one version of the film, or heard the film sound tracks. Two comparisons were made: (1) between versions of the film, and (2) between version two of the film and sound track only groups.

Results.—(1) All of the modified commentaries were superior to the original version, but the differences were nonsignificant. (2) Students who did not see the film, but heard only the sound track scored only one-fifth lower than the best scores of the groups which saw the films. (3) There was no significant difference between scores on the verbal and diagrammatic tests for differing methods of instruction. (4) The best configuration of variables for maximum learning was (a) presentation of new information both visually and aurally, (b) narration references to visual information, (c) repetition of facts, and (d) use of vivid, personal commentaries.

224. NEU, D. MORGAN. "The effects of attention-gaining devices on film-mediated learning." *Abstracts of Doctoral Dissertations, The Pennsylvania State College,* Vol. 13. State College: The Pennsylvania State College, 1951. p. 414–417. (See also *Jour-*

nal of Educational Psychology 42 (1951), 479–490; Technical Report SDC 269-7-9. Port Washington, Long Island, N. Y.: U. S. Navy Special Devices Center, 1950.)

Problem: Determine whether learning from a short film is increased if filmic devices are used to gain attention at important points.

Sample: 2,631 Army and Navy recruits.

Subject taught: Precision instruments.

Key variables: Visual and sound, relevant and irrelevant film devices to attract attention, learning of information and recognition and recall of devices.

The sample was divided into six groups. One group saw the film with visual relevant devices, one with visual irrelevant devices, one with sound relevant devices, one with sound irrelevant devices, and one control group which did not see the film. All subjects took a 25-item multiple-choice information test after the film (K–R $r=.94$), and a test on recognition or recall of the attention-getting devices. Scores on the first test were adjusted for scores on a mental ability and a mechanical aptitude test by analysis of covariance.

The mean of all film groups was significantly greater than that of the control group. All film groups had higher scores on the information test than the sound irrelevant group. Generally, there were no other differences between groups.

There was a small correlation between scores on the information test and scores on the recall of devices test.

It was concluded that attention-gaining devices which do not add any additional information do not increase learning from a film.

225. NOALL, MATTHEW F., and LERUE WINGET. "Staff utilization studies help Utah educators. B. The physics film project." *National Association of Secondary School Principals Bulletin* 43 (1959), 183–195.

Problem: Effectiveness of films for teaching in schools with inadequately prepared instructors.

Sample: 20 high schools.

Subject taught: Physics.

Key variables: Learning, film teaching, face-to-face teaching, subject knowledge, study habits, mental ability, student interests, classroom size.

Ten experimental (film-taught) and 10 control (face-to-face taught) schools were used to determine the feasibility of using the film series *Harvey White Physics* in schools with inadequately prepared instructors and ill-equipped laboratories. Very large interschool differences prevented matching groups. Achievement was compared within subgroups of school size. The only significant difference in achievement due to method of instruction was found in the medium-sized schools where face-to-face taught students did significantly better than film-taught students. There were no significant differences in student motivation or dropout rate for methods of instruction in all sizes of schools. There was some indication, nonsignificant, that medium-ability students learn more from film instruction than from face-to-face instruction.

Student and teacher responses to a questionnaire showed positive satisfaction with the film experiment. Student responses were usually favorable and teacher responses were tempered by individual training and experience in teaching physics.

Conclusions.—Physics can be successfully taught with films. Achievement is more related to student ability than method of instruction. The films have enrichment value in schools with trained instructors. Schools with untrained instructors and ill-equipped laboratories can use the films as a basic departure point for physics instruction.

226. "The North Carolina In-School Experiment, 1958–59." University of North Carolina, 1959. NAEB Research Fact Sheet, Series I, 85, *NAEB Journal* 19 (July 1960), 1–2. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 12,000 students.

Subjects taught: Grade 11 American history, Grade 10 world history, Grade 9 physical science, Grade 8 mathematics.

Key variables: TV teaching, face-to-face teaching, learning.

Students in 114 classes in 81 schools were taught subject-matter by open-circuit TV in groups of 90 to 200. These students, as well as similar groups of students who were taught the same subjects in the same schools face-to-face, were given standardized tests of subject-matter in September. Lessons were broadcast over WUNC-TV (Chapel Hill) and six commercial TV stations to cover experimental schools. Lessons were made in the studio and on outside locations, such as libraries, museums, and legislative halls through use of a TV mobile unit.

In May a different form of the standardized tests was given to all students, TV and face-to-face taught, who participated in the experiment. In comparing the scores for the methods of instruction, significant differences were found favoring the TV-taught groups for American history, general science, and mathematics. Other differences were not significant. Analysis of covariance with an adjustment for pretest scores was used to compare groups. The conclusion of the Educational Testing Service was that "TV instruction in the North Carolina experiment is, on balance, more effective than conventional [face-to-face] instruction."

227. NORTHROP, DEAN S. Effects on learning of the prominence of organizational outlines in the instructional film. Technical Report SDC 269-7-33. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1952.

Problem: Learning effectiveness of titles and subheadings for instructional films.

Sample: 1,547 naval recruits.

Subjects taught: Chemical warfare, fire control, survival.

Key variables: Original film, film with no titles, film with titles and subheadings, learning, intelligence.

Recruits were divided into 12 groups, chosen to be matched on basis of Navy General Classification Test. Three versions of each film were prepared: (1) the original version with no titles, (2) a version with titles and mainpoint outline added, and (3) a version with titles, mainpoint and subpoint outline added. The following films were chosen: (1) Chemical warfare, *Prepare for Gas*, as a discrete item type of film with independent facts without internal structure, (2) fire control, *Chemistry of Fire*, as a logical development type of film with dependent facts and internal structure, and (3) survival, *The Castaways, Part I*, as a chronological development type of film with dependent facts and internal relationships.

Results.—The scores for tests of film content for each type of showing were:—

Item	*Adjusted mean test scores*		
	Gas warfare	*Fire control*	*Survival*
Number	120	124	100
No film	18.35	22.27	20.11
Original	36.20	40.62	43.21
Main topics	39.04	39.29	43.80
Subheads	39.94	38.61	44.08

Using analysis of covariance technique the mean test scores for two of the three films (gas warfare and survival) showed a tendency to increase as the amount of outlining increased, but a reverse tendency was found for one film (fire control). The results were statistically significant only for the gas warfare film since the only significant differences were in favor of both outlined versions of the film over the nonoutlined original version.

These results indicate that the organizational outline of an instructional film may be expected to increase learning from the film, if the film is not inherently organized. The negative effect of outlining on learning for the fire control film was attributed to the interference of the outlining with the highly organized original film presentation.

The authors noted that most of the learning increases (four out of six comparisons) came from students in the less intelligent half of the class.

228. NUNNALLY, NANCY. "Primary films as a factor in promoting conceptual and factual learnings in kindergarten chil-

dren." *Dissertation Abstracts* 15 (1955), 2490.

Problem: Determine how much children learn from films, and the relationship of film learning to reading readiness and family socioeconomic status.

Sample: 60 kindergarten children randomly selected from four large city schools.

Subject taught: Two children's films, one about a deer and one about a rabbit.

Key variables: Learning, reading readiness, and socioeconomic status.

All children were given two tests of learning proficiency, a reading readiness test, and were interviewed to determine other aspects of their family life. Children were given a pretest before seeing each of the two films and were given a posttest the same day after seeing each film.

All children learned from the films; they learned significantly more from the unfamiliar film than from the familiar film. This result was to be expected since learning was operationally defined as the amount of increase from pretest to posttest scores. Scores of learning from films correlated with reading readiness scores. Measures of attending movies, watching constructive TV programs, and hearing stories were all correlated with scores of ability to learn from films. Children's socioeconomic status ratings correlated little or none with scores of ability to learn from films.

229. ORTGIESEN, LEROY. "The relative effectiveness of selected filmstrips and sound motion pictures in teaching soil conservation in ninth-grade social studies classes." *Dissertation Abstracts* 14 (1954), 642.

Problem: Compare 35 mm silent filmstrips and sound motion pictures in teaching and changing attitudes toward soil conservation to ninth-grade social studies classes.

Sample: 753 students from seven schools.

Subject taught: Soil conservation.

Key variables: Filmstrips, sound motion pictures, quantity of students' reading, printed instructional materials, attitudes, learning.

The 753 students were divided into three groups; one group receiving the eight filmstrips and printed materials; one group receiving the filmstrips, five motion pictures, and printed materials; and the control group receiving the printed materials. When possible, the same teacher taught both an experimental and a control group.

Attitude and knowledge instruments were developed and reliabilities obtained by split-half methods.

Analysis of covariance and t-tests were used. From analysis of the scores on the constructed instruments, the authors concluded that educational filmstrips were significantly more effective than sound motion pictures, and both were more effective than printed materials.

Filmstrips and sound motion pictures, shown during the time normally set aside for discussion, were as effective in changing attitudes as were printed materials.

Neither filmstrips nor sound motion pictures adversely affected the quantity of students' reading about soil conservation.

230. PAINTER, WILLIAM I. *Production and use of classrooms on film versus traditional observations in teacher education.* USOE Project No. 127. Akron: The University of Akron, June 30, 1961. (Mimeographed).

Problem: Determine the relative effectiveness and practicality of using films and direct classroom observation.

Sample: 347 students at the University of Akron.

Subject taught: Educational psychology.

Key variables: Film and direct observation; learning.

The experimenters produced nine films of representative classroom activities. Six of these were at the elementary school level, one at the junior high school level, and two at the senior high school level. The activities were unrehearsed. For each of the three semesters of the experiment, two control and two experimental groups were arranged. The control groups observed the classroom directly and the experimental groups watched the films instead. Two achievement tests were constructed. One had 84 questions with 34 items having r_{bis} values of .30 or above, 35 items having r_{bis} values from .20 to .30, and the remainder having r_{bis} values from .10 to .20. The second test had 76 items which had similar r_{bis} distributions.

For the first experiment there were 46 control students and 44 experimental students. The control group made six direct observations and the experimental students watched two films. Analysis of variance indicated no significant differences in achievement scores between experimental and control groups.

The second experiment the following semester had 61 control and 69 experimental students. The control group made six direct observations and the experimental group watched six films. Analysis of variance indicated that the experimental students had significantly higher achievement scores (.01 level) than control students.

During the third semester there were 60 control and 67 experimental students. The control students made nine direct observations and the experimental group watched nine films. Analysis of variance indicated no significant differences in achievement scores between experimental and control groups. Total differences for the combined three semesters, using different students each semester, tended to favor the film-treatment group.

231. PARSONS, T. S. "A comparative analysis of some outcomes of instruction by kinescope, correspondence study and classroom procedures." Ann Arbor: School of Education, University of Michigan, 1955. (Duplicated). In Hideya Kumata, *An Inventory of Instructional Television Research.* Ann Arbor: Educational Television and Radio Center, Dec. 1, 1956. (Offset).

Problem: Determine the relative effectiveness of kinescope-correspondence study groups without an instructor, conventional classroom discussions with an instructor, and independent correspondence study.

Sample: 20 students in a control group with no instruction, and 20 in the other three groups.

Subject taught: Psychology of child development.

Key variables: Cohesiveness, attitude, attitude over time, learning, and retention; ITV and face-to-face presentation.

The classroom group met twice a week with the instructor and the kinescope group met about once a week. Students took achievement, sociometric, and attitude tests before, during, after, and four months after the course.

There were no significant differences among the three experimental groups on achievement test scores for any of the three testings. For the retention testing, the correspondence group had significantly higher scores than the classroom group, with the kinescope group in between. Evaluation of written work scores indicated no significant differences for all four testings, although the rankings (from high to low scores) were correspondence, kinescope, and finally classroom groups.

There were no significant differences in mean cohesiveness scores between the kinescope and classroom groups. Total (positive plus negative) choices on the sociometric test increased significantly for the classroom group from pre- to posttest, but tended to decrease for the kinescope group. The difference between the two groups was significant for both the posttest and delayed posttest.

Students preferred the presentation method they were receiving over the other two.

232. PASEWARK, WILLIAM ROBERT. "The effectiveness of television as a medium of learning typewriting." *Dissertation Abstracts* 17 (1957), 579.

Problem: Determine the effectiveness of learning typewriting by television.

Sample: Students in typewriting class.

Subject taught: Beginning typewriting.

Key variables: Typing speed and accuracy and pattern of learning; television and face-to-face presentation.

Typewriting students were divided into two groups matched by ACE scores. One group was taught by television; the other by face-to-face methods. Both groups took 48 50-minute typing lessons from the same instructor. At the end of the course, all students took a timed typewriting test. The students in the television group typed significantly faster than the students in the conventional group. On a tabulation and personal business letter exercise at the end of the course, students in the face-to-face group had slightly, but not significantly, fewer errors.

From a series of nine timed typing tests taken during the semester, it was noted that television students were generally superior in speed and accuracy, although the pattern of learning appeared to be about the same in both groups.

233. PATRICK, ROBERT B. *The measurement of the effectiveness of the documentary sound-film as a supplement in the teaching of methods to college students being prepared to teach in the secondary schools.* USOE Grant No. 736054. University Park: Pennsylvania State University, 1958. (Offset).

> *Problem*: Determine the relative effectiveness of documentary sound films in teacher education.
>
> *Sample*: 120 students at Pennsylvania State University.
>
> *Subject taught*: Specific techniques of teaching.
>
> *Key variables*: Film and face-to-face presentation; learning and evaluation of teaching experiences.

Students were randomly assigned to control or experimental groups. The experimental students did the classroom observing through films; the control group by face-to-face observation. All students took as pre- and posttests an attitude scale of high school teaching, a multiple-choice test of understanding secondary school teaching methods, and an educational psychology test. Test-retest *r*'s were .61, .17, and .54 respectively. Students completed an evaluation of AV and related observations, four essay tests, and a teacher evaluation checklist. Students were also interviewed.

Both films and face-to-face groups made significant gains (.01 level, by *t*-test) in pretest to posttest scores on the understanding secondary teaching methods test. Students in the experimental group tended to make higher scores on this test than students in the control group. Chi-square analysis indicated that experimental students tended to evaluate their observation experiences higher. Experimental students consistently tended to have higher scores on the essay tests than the face-to-face students.

In two of three experiments run, the experimental students had significantly higher ratings as student teachers (.01 level) than the face-to-face observation students. In the third experiment the same trend existed, although the difference was not significant.

234. PATRICK, ROBERT B., and HUGH M. DAVISON. *The effectiveness of the documentary sound-film as a supplement in secondary school teacher education—a follow-up of first year teacher performance.* USOE Grant No. 7–48–0720–177. University Park: Pennsylvania State University, September 1, 1963. (Offset).

> *Problem*: Determine the lasting effectiveness of face-to-face and film observation methods.
>
> *Sample*: 194 students at Pennsylvania State University who had had the film or face-to-face observation treatment.
>
> *Key variables*: Film and face-to-face presentation; retention.

Beginning teachers who had observed filmed teaching techniques in *general*-methods classes were rated significantly higher by their supervisors on techniques which were covered by the films than beginning teachers who had not seen the films. A similar trend, although not a significant one, was observed for beginning teachers who had observed films in teaching *special*-methods classes.

Beginning teachers who had observed films tended to have more favorable scores on an attitude toward supervision scale. Supervising teachers gave significantly higher grades to beginning teachers who had observed films. There were no significant differences between experimental and control groups of beginning teachers on a manifest anxiety scale.

235. PEERSON, NELL. *An experiment with evaluation, in the eradication of adult illiteracy by use of television instruction*

over a state educational television network supplemented by supervised group viewing and by the related use of project-supplied materials of instruction. USOE Project No. 417. Florence, Ala.: Florence State College, August 1961. (Mimeographed).

Problem: Determine the effectiveness of an ITV program supplemented by group viewing.

Sample: 254 students in 11 relatively illiterate Alabama counties.

Subject taught: Adult literacy.

Key variables: Television and face-to-face presentation and learning.

Students in the 11 counties saw 98 half-hour kinescopes on television and had teacher help for another half hour three nights a week. Teachers were volunteers, and the typical student was in his forties and desired self-improvement. Four specially constructed instruments were given to all students during the year as well as to grades 2, 3, and 4 in certain Alabama schools. Students also took the Primary II level of the Metropolitan Reading Test and two handwriting scales.

No tests of statistical significance were indicated. The author reports that although the students had lower scores initially than the average second-grader in Alabama schools, by the end of the year the ITV students were somewhat ahead of Alabama second-graders. Students were generally favorable toward the course.

236. PETERSON, ELEANORA L. "Relationship of income level to the effectiveness of an educational television film." *Audio-Visual Communication Review* 6 (1958), 207–212.

Problem: Determine the relation between film attitudes and family income level.

Sample: 56 Los Angeles eighth- and ninth-grade girls.

Subject taught: Buttonhole making.

Key variables: Income level, attitudes.

Two Los Angeles schools were selected as representing the extreme ends of income level. A class of eighth- and ninth-grade girls in each school saw a 13-minute film on making piped buttonholes. Neither teacher had previously demonstrated this to her class. After the film, a questionnaire was read to the pupils; the author read the questionnaire to the high-level group, and the teacher of the low-level class read their questionnaire, and explained meanings of words on the questionnaire to them when necessary.

On all questions about improving the film, the low-level group was more discriminating than the high. The author mentions this difference might be due to a greater interest in sewing because of economic necessity.

237. PETERSON, JACK ARNO. "The effectiveness of selected motion pictures in changing the beliefs of Nebraska secondary school students relative to the United Nations and its activities." *Abstracts of Doctoral Dissertations, The University of Nebraska,* Vol. 11. Lincoln: The University of Nebraska, 1950. p. 159–164.

Problem: Determine attitude changes and information gains about the United Nations from films.

Sample: 2,227 Nebraska secondary school pupils from selected areas in the state.

Subject taught: The United Nations.

Key variables: Film and incidental face-to-face presentation, learning and attitudes.

Students in experimental and control schools received both a belief and a factual instrument, as pre- and posttests. Experimental school students viewed the five films in a convocation setting; the control school students received only incidental teaching about the United Nations.

Chi-square technique comparing the pre- and posttest responses of the experimental group with the pre- and posttest responses of the control group revealed significant differences on half of the items on the belief scale.

The experimental group also made significantly higher scores on the factual instrument than the control students receiving incidental teaching.

The use of films encouraged many students to do additional reading about the United Nations.

Students were favorable toward the use of films, but indicated that repeating scenes in different films was distracting.

238. **Pflieger, Elmer F.** "Detroit TV teaching project: Report for the year 1957–1958." Detroit (Michigan) Public Schools, 1958. (Mimeographed). NAEB Research Fact Sheet, Series I, 57, *NAEB Journal* 18 (March 1959), 1–4.

Problem: Comparative effectiveness of larger-than-normal classes using TV teaching and normal-sized classes using only face-to-face teaching.

Sample: See below.

Subjects taught: Conversational Spanish (grade 3), science (grade 5), health (grade 5), science (grade 8), world history (grade 9), American literature (grade 11).

Key variables: Size of class, learning, face-to-face, instructional TV presentations, listening test, teacher reactions.

Classes were assigned to TV or face-to-face methods of instruction. Classes of both methods had the same outline and were equally long. Achievement was measured on standardized tests for content and students in both groups were given Listening Tests in Sequential Tests of Educational Progress.

Results.—Pupils in the TV classes learned as much subject matter as children in the control (face-to-face) classes. Some significant differences favoring the TV classes were noted. On the listening test TV students scored lower than literature class and one semester's class in Grade 8 science. Teachers reported that some of the novelty effect of TV was wearing off and some students were losing interest in TV instruction after the first semester. Teachers were also concerned about the lack of teacher-student face-to-face contact during TV instruction. Students in American literature Grade 11 learned especially well by TV as indicated on subject-matter tests and the listening test. Grade 3 Spanish students learned well from TV, but no comparison has yet been made between TV and face-to-face teaching of Spanish.

239. **Pflieger, Elmer F.** *The television teaching project report for the year 1959–1960.* Detroit: Detroit Public Schools [n.d.]. (Mimeographed).

Problem: Determine the relative effectiveness of learning from ITV and face-to-face presentations.

Sample: See below.

Subject taught: American literature (first and second semesters), junior high science (first and second semesters), world history, elementary science, and health.

Key variables: Learning; face-to-face and ITV presentations.

Classes assigned to face-to-face or ITV treatments, both treatments followed the same outline, and the length of the class period for both groups was the same. The number of ITV and face-to-face pupils in each course for American literature (first semester) was 273 and 246; (second semester), 214 and 114; science (first semester) 268 and 232, (second semester), 232 and 212; world history, 263 and 352; elementary science, 515 and 299; health, 535 and 314. Students were matched on Detroit Alpha Intelligence and Detroit Tests of Learning Aptitude scores, Sequential Tests of Educational Progress (STEP) listening test scores, and sex. American literature students took a specially prepared test before and after the course, science students took a STEP science test before and after the course, world history students took the Cummings World History test before and after the course, and elementary science and health students took tests from the Social and Related Sciences before and after the course. The *t*-tests indicated that the ITV and face-to-face groups were not significantly different initially on any of the matching measures.

The *t*-tests between face-to-face and ITV pupils' final subject-matter scores for each of the seven courses indicated one significant difference (.05 level) favoring the ITV students (American literature first semester) and one significant difference (.05 level) favoring the face-to-face students (elementary science).

240. **Pflieger, Elmer, and Fred C. Kelly.** "The National Program in the Use of Television in the Public Schools." New York: The Ford Foundation and the Fund for Advancement of Education, 1961. *Audio-Visual Communication Review* 10 (1962), 128. (Abstract).

Problem: Compare the achievement of students in large classes viewing television with students in face-to-face classes.

Sample: 200,000 students in 800 schools.

Key variables: Television in large classes and face-to-face presentation; learning.

In the third year of the study, students in TV classes learned as much as students in face-to-face classes. TV students did significantly better in 48 comparisons, and face-to-face students did significantly better in 24 comparisons. Over the three years, 119 comparisons were significant in favor of TV students, and 44 favored the face-to-face students.

241. PHILLIPS, JOHN ANDERSON. "A study designed to determine the spelling learning which may be attributed to a specific series of spelling lessons presented by television." *Dissertation Abstracts* 20 (1959), 2182–2183.

Problem: Determine the relative effectiveness of learning by a televised *Learn to Spell* series, a method similar to *Learn to Spell* only without the use of television, and by conventional methods.

Sample: 18 fourth-grade classes.

Subject taught: Spelling.

Key variables: *Learn to Spell* television series, *Learn to Spell* face-to-face techniques, conventional spelling teaching; learning.

Six fourth-grade classes were each assigned to one of the three treatments. All students took three achievement tests.

Analysis of variance and t-tests indicated there were no significant differences in spelling achievement among any of the three groups.

242. PITKIN, VERNON. "An adventure in ETV: 'Asia in ferment.'" Connecticut State Department of Education, Division of Instruction, 1957. (Mimeographed). NAEB Research Fact Sheet, Series I, 54, *NAEB Journal* 17 (November 1958), 1–4. (Abstract).

Problem: Comparative effectiveness of television and face-to-face teaching.

Sample: 17 Connecticut schools.

Subject taught: Asia.

Key variables: TV teaching, face-to-face teaching, classroom teacher motivation, students' attitude.

Students in 16 schools were taught by open-circuit television. Students in one other school were taught face-to-face as a control group. Comparing performance on tests, the author concludes that: (1) All students of all ability levels made significant gains from instruction. (2) Students taught by TV where the classroom supervising teacher gave heavy emphasis to the TV lesson made significantly better gains than students in classrooms where supervising teacher gave program little emphasis. (3) TV instruction produced widely differing effects on attitudes toward Asia. Some students gained sympathy for Asia while others lost sympathy. (4) Students felt 36 program series was too long. (5) Guest authorities brought to the program were the series' highlight. (6) TV presentation motivated many classroom teachers to begin a face-to-face presentation on Asia.

243. POLLOCK, THOMAS CLARK, and others. *Closed-circuit television as a medium of instruction 1955–56*. New York: New York University, October 1956.

Problem: Determine the relative effectiveness of ITV and face-to-face presentation on learning and determine students' attitudes.

Sample: See below.

Subjects taught: Composition and English literature.

Key variables: Learning, attitudes, and attitudes over time; face-to-face and ITV presentation.

The first semester 86 students took English literature; the second semester, 90 students. The first semester 251 students took composition; 222 students, the second semester. For both courses, ITV classes lasted 2 hours a week with a discussion the third hour.

In the fall, 31 percent and 45 percent of the composition and literature students were undecided or unfavorable toward ITV, and 69 percent and 55 percent were favorable. Composition students did not change their attitudes over time, but literature students tended to become more favorable. Students in both classes tended to rate the ITV course as less effective than face-to-face courses.

Generally there were no significant differences in the final grades of ITV and face-to-face students, except that in the second semester, face-to-face students tended to achieve higher grades than ITV students.

244. POPHAM, W. JAMES, and JOSEPH M. SADNAVITCH. *The effectiveness of filmed science courses in public secondary schools.* [USOE Title VII Project No. 091.] Pittsburg, Kansas: Department of Education and Psychology, Kansas State College of Pittsburg, August 1960. (Offset).

Problem: Determine the relative effectiveness of filmed physics and chemistry courses.

Sample: 312 physics students and 475 chemistry students in 12 southeast Kansas secondary schools.

Subjects taught: Physics and chemistry.

Key variables: Film and face-to-face presentation; learning, ability, attitude, and attitude over time.

There were 155 physics students that saw 149 30-minute Encyclopaedia Britannica physics films, and 157 received physics by face-to-face presentation. A total of 234 chemistry students saw 132 30-minute Encyclopaedia Britannica chemistry films and 241 received chemistry by face-to-face presentation. Students took the Cooperative Physics Test (or Cooperative Chemistry Test), Thurstone Interest Schedule, and Purdue's Scale for Measuring Attitudes Toward Any School Subject. Otis Quick-Scoring Mental Ability scores were available. Students also took a 30-item Likert film attitudes questionnaire, and teachers completed a Teacher Reaction Survey.

Analysis of covariance indicated that posttest scores of face-to-face physics students were significantly higher than posttest scores of film physics students. There were no significant differences between the posttest achievement scores of the two chemistry groups. There was no significant interaction of presentation method by ability level for either the physics or chemistry students. Mann-Whitney *U* tests indicated no significant differences between the two physics groups in their interest in physical science, although the attitude of experimental students tended to be lower than control students. The lower-ability chemistry film group had significantly less interest in physical science than the lower-ability chemistry face-to-face group. Both chemistry and physics face-to-face and film groups had a more unfavorable attitude at the end of the course than at the beginning, but attitudes of the film groups were significantly more unfavorable than those of the nonfilm groups.

245. PURDUE UNIVERSITY. "Closed circuit television instruction." Station WBAA, Lafayette: Purdue University, 1956. *Audio-Visual Communication Review* 6 (1958), 77–78. (Abstract).

Problem: Determine students' and teachers' attitudes and determine the effectiveness of ITV.

Sample: Classes having from 26 to 51 students.

Subjects taught: Analytic geometry, government, and general bacteriology.

Key variables: Learning and attitudes; ITV students and students in similar classes the previous year.

Students in analytic geometry were not enthusiastic and the talkback system was not satisfactory. Test scores of ITV students did not differ from students in the previous year's class.

Students in government complained of lack of talkback, lack of clarity of visuals, difficulty of taking notes in a dark classroom, not having the instructor in the room, having difficulty seeing around other students, and the instructor's restricted movement. Students appreciated the teacher's preparation, the visuals, and the ability of television to direct attention. There were no differences in learning.

Students in bacteriology felt they learned more, felt the course was more interesting, that television permitted closer viewing, had a greater variety of demonstrations, and that television enabled them to pay attention and learn more easily. They disliked sitting on a lab stool, the glare from the glassware, the small screen, and other technical difficulties. There was little difference in test scores.

246. RADLOW, ROBERT. The relation of some measures of ability to measures of learning from sound motion pictures. Technical Report SDC 269–7–58. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1955.

See also "Some factor-pure abilities and their relation to learning from sound motion picture films." Master's thesis. Pennsylvania State University, 1953.

Problem: Effect of certain mental abilities on learning from films.

Sample: One company of recruits at Indiantown Gap Military Reservation.

Subjects taught: Measuring instruments, meterology.

Key variables: Learning from films, scores on five facets on Guilford-Zimmerman Aptitude Survey.

One company of Army recruits was given a selected version of the Guilford-Zimmerman Aptitude Survey to measure the following aptitude factors: (1) verbal comprehension, (2) general reasoning, (3) perceptual speed, (4) spatial orientation, and (5) spatial visualization. An information pretest was given to all the recruits. The films were shown to half of the group. The same information test was given as a delayed posttest one week later to measure information learned.

Intercorrelations of the information learned and the five factors were calculated for both groups. Differences between the film and nonfilm groups were identified through factor analysis.

Conclusion.—Verbal comprehension, general reasoning, and spatial orientation factors were the best predictors of learning from these films.

247. REEDE, ARTHUR H., and ROLAND K. REEDE. *Televising Instruction in Elementary Economics.* Industrial Research Bulletin No. 5. University Park: The College of Business Administration, Pennsylvania State University, 1963.

Problem: Determine the relative effectiveness of ITV and large-screen ITV on the same and on different campuses, and determine students' attitudes.

Sample: See below.

Subject taught: Elementary economics.

Key variables: Attitudes, attitudes over time, achievement; small- and large-screen TV.

On three campuses 214 students took an achievement test having an objective portion (correlation between two halves=.76) and a problem-solving portion (correlation between two halves=.70). Split-half reliability coefficients (corrected by Spearman-Brown) for the second and final examinations were .85 and .86 for the objective portion and .83 and .84 for the problem-solving portion. 134 students saw the course on 24" monitors and 80 saw the course via an *Eidophor* large screen TV projector. Analysis of variance run on scores of students in the various groups indicated a nonsignificant *F* ratio. Analysis of variance also indicated no significant differences in over-all achievement scores between the *Eidophor* students and large lecture face-to-face students who had taken the course the year before.

A chi square (with Yates' correction) run on scores of students in the *Eidophor* treatment on the problem-solving portion of the three instruments indicated that *Eidophor* students' scores were significantly lower than problem-solving scores of students on the same or other campuses who saw the course on 24" monitors. There were no significant differences among groups on scores on the objective portions of the instruments.

An attitude questionnaire was given 137 students. About 2 percent thought that the talkback system was "frustrating," and 17 percent thought it "mildly disturbing." On the other hand, 12 percent thought it was frustrating not to have the instructor in person, and 17 percent thought it was mildly disturbing. Attitudes of students over time (after 5, 10, and 15 weeks) showed increasing favorability toward ITV.

Spearman's *rho* for problem scores and number of absences was —1.00, and for problem scores and number of outside of class consultations with the teacher was .99.

[See Summary No. 103, and Rich, O. S. "A study of comparative effectiveness and acceptance of Eidophor large-screen television for college instruction." Doctoral dissertation, Pennsylvania State University, University Park, 1963.]

248. **Reid, J. Christopher.** *An experimental study of a comparison of content learned, attitude toward subject matter, and attitude toward instructional television of students in a public speaking course presented by television and face-to-face methods.* Columbia: Instructional Television, University of Missouri, 1960. (Typewritten).

Problem: Determine the relative effectiveness of face-to-face and ITV presentation, and determine students' attitudes toward public speaking, and ITV.

Sample: 122 students in section I, 143 students in section II.

Subject taught: Public speaking.

Key variables: Ability, learning, attitudes, and attitudes over time; face-to-face and ITV presentation.

Each week, students in section I received one 50-minute ITV lecture and had two 50-minute face-to-face classes taught by a graduate student. Students in section II received one 50-minute face-to-face lecture by the same professor and also had two discussion classes. In the middle of the semester, the sections exchanged treatments. Both sections took a subject-matter test, an 11-item attitude toward ITV test, and a 5-item attitude toward public speaking test before, in the middle, and at the end of the semester. The *t*-tests indicated no significant differences between sections I and II on pre-subject matter test scores or on the Ohio State Psychological Examination percentile ranks, but section II had a significantly higher grade point average than section I.

There were no significant relationships between students scores on either of the attitude instruments and scores on the subject-matter test for any of the three testings. Scores on the final subject-matter test correlated .40 and .54 with OSPE percentile ranks, .41 and .59 with GPA, and .37 and .33 with final grades in the course.

There were no significant differences between the two sections in mean scores on either the mid-semester or the final subject-matter test, and there were no significant differences between the two sections on final grades.

Section I students were significantly more favorable toward ITV at the beginning of the course than section II students, and remained so throughout the course. Mean attitude scores of section I students increased at mid-semester and declined slightly at the end of the year. Scores of section II students did not change from pretest to mid-semester, but tended to become more favorable from mid-semester to the end of the course.

There were no significant correlations between mean scores of attitude toward ITV and attitude toward public speaking. The *t*-tests indicated no significant differences between the two sections on attitude toward public speaking scores for any of the testings.

With students divided into sections taught by different graduate students, analysis of variance run on the final attitude toward speech scores resulted in a significant *F* ratio (.01 level).

249. **Rock, Robert T., J. S. Duva, and J. E. Murray.** The effectiveness of television instruction in training Naval Air Reservists. Technical Report SDC 476–02–S2. *Instructional TV Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, April 1951.

Problem: Determine relative effectiveness and acceptance of live TV, recorded TV and face-to-face instruction for geographically widely separated groups.

Sample: 360 Naval Air Reservists.

Subjects taught: Refresher course for officer pilots, basic course for enlisted men.

Key variables: TV, kinescope, and face-to-face instruction.

Naval Air Reservists at nine naval air reserve stations were used in the experiment, grouped as follows:

1. Three stations taught by live TV.
2. Three stations taught by kinescope recordings of the TV lessons shown as films.
3. Three stations taught same lesson material by local instructor.

Approximately 40 men at each station received instruction by one method, making approximately 120 men being taught under a given method of instruction. Two lesson series of eight lessons each were given, one a refresher course for officers, the other a basic course for enlisted men. Pretests and posttests were given each man. All men were told they were in an experiment in teaching methods. Pretest contained 30 multiple-choice items and the posttest contained the same 30 items plus 30 additional items. Written comments were invited at the end of each lesson. The live TV group had a feedback microphone so they could question the instructor during the lesson. The recorded TV group saw the recording as a motion picture film. The local instructor group heard a lesson planned from the TV lessons, but not a verbatim transcript. Comments were invited during the experiment from the research staff and the naval officer advisory group.

Based on the examinations, the following percentage of comparisons indicating the specified conditions were found:

Method of instruction and comparison	*Percent in—*	
	Officers' course	*Enlisted men's course*
TV superior to face-to-face	50	53
TV equivalent to face-to-face	38	20
TV inferior to face-to-face	13	27
Kinescope superior to face-to-face	38	47
Kinescope equivalent to face-to-face	44	27
Kinescope inferior to face-to-face	19	27
TV superior to kinescope	6	27
TV equivalent to kinescope	94	73
TV inferior to kinescope	0	0

The above comparison comes from the differences between the mean adjusted scores on pretest and posttest for the three groups. Adjustment for individual inequalities on pretest scores was made by analysis of covariance. Differences were significant if they met or exceeded the .05 level of confidence.

Comments by the subjects tended to be favorable toward TV as a means of instruction. The project staff felt the talkback microphone was inadequate because a great many trivial questions were asked by the students. They also expressed a need for better visualization and production techniques.

The authors concluded the following about production design:

1. Direct narration by the TV instructor is an effective means of teaching. In analyzing the content of the programs where the instructor talked directly to students without dramatization, TV tended to be superior to face-to-face instruction.
2. Animated film sequences were effective.
3. A combination of dramatic action and narration was ineffective.

The authors conclude TV is an effective and acceptable means of instruction for geographically widely separated groups.

250. ROCK, ROBERT T., JAMES S. DUVA, and JOHN MURRAY. A study of learning and retention from television instruction transmitted to army field force reservists. Technical Report SDC 476–02–S3. *Instructional TV Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Training Devices Center, 1951.

Problem: Instruction of geographically separated groups of officers and enlisted men.

Sample: 3,000 Army reservists.

Subject taught: Army operations during encounter with enemy troops.

Key variables: Learning gains from pretest to posttest, learning gains from posttest to delayed retest, attitudes toward instructional television.

Three thousand Army reservists were given a series of eight one-hour televised lessons over part of a commercial TV network in eastern and north central cities. Reservists assembled in groups of 160 to view the lessons transmitted from New York City. Lessons were prepared by Army Command and General Staff College. Multiple-choice tests were constructed by the authors to be used as pretest, immediate posttest, and delayed (1–6 weeks) retest. Scores were evaluated by difference in number of items completed from pretest to posttest and retest, and difference in percent of items correctly completed.

Subjects ranged in rank from private to colonel with almost all Army branches represented. Each of the programs was presented as a dramatization by professional actors. A section of each test was devoted to a reaction survey and a rating scale for reaction to total series was included in the final testing session.

All grades of officers and enlisted men made higher scores on posttests than pretests. When analyzed by rank, all groups made higher scores after instruction. Officers retained 85 percent and enlisted men retained 65 percent of newly learned material over a period of six weeks.

Four-fifths of the total sample reported the lessons as interesting or very interesting. A majority of the group thought the lessons excellent or good. About 75 percent thought they would rather be taught by TV than by any other method. Officers tended to favor TV as a means of instruction more than enlisted men.

In viewing kinescopes and classifying concepts taught as "explicit," "sketchy," or "not covered," the authors concluded that information gain is related to the explicitness with which a concept is taught. Items explicitly covered showed the highest information gain and longest retention. The authors also reported that subjects taught by direct narration seemed to learn and retain better than subjects taught by dramatization alone.

251. **Rogers, William R.** *Television utilization in the observation program for teacher education.* USOE Grant No. 704001. San Jose, Calif.: San Jose State College, 1959–1962. (Offset).

Problem: Determine the relative effectiveness of varying amounts of television and face-to-face observation.

Sample: 500 students. (Four replications.)

Subject taught: Elementary school curriculum and observation.

Key variables: Amount of observation, television and face-to-face observation.

Students were divided into five groups. One group had television observation plus twelve hours of face-to-face observation, another group had television plus 25 hours of face-to-face observation, a third group had television plus 37 hours of face-to-face observation, and the two remaining (control) groups had no television and 50 hours each of face-to-face observation.

College scholarship, age, sex, College Qualification Test scores, and a faculty rating sheet data were available for all students. Students were also rated on relationships with children, with staff, teaching techniques, and on personal qualifications.

Analysis of variance technique indicated no significant differences among scores of students in the five groups for College Qualification Test scores, grade-point average, or scores on the faculty rating sheet. Analysis of covariance controlling for grade average indicated no significant differences among groups on the four rating scales.

252. **Romano, Louis.** "The role of sixteen millimeter motion pictures and projected still pictures in science unit vocabulary learnings at grades five, six, and seven." *Audio-Visual Communication Review* 5 (1957), 551–552. (Abstract).

Problem: Determine the effectiveness of films and slides in learning.

Sample: Fifth, sixth and seventh graders in Shorewood and Whitefish Bay, Wisconsin.

Subject taught: Science.

Key variables: Film and slide presentation, immediate and delayed learning of vocabulary, attitudes.

Control and experimental pupils had several visual aids, but only experimental pupils had films and slides. Treatments were rotated so that each group was an experimental and a control group. Fifty-item vocabulary tests were given as pretests, posttests, and delayed (6 months) posttests for each of the six study units.

Gain scores of experimental groups were greater than control groups in all units. There was some tendency for experimental groups to make higher scores on the delayed posttest than the control groups. There seemed to be little relationship between measures of ability and vocabulary test scores.

Pupils were favorable to the use of films and slides.

253. **Rosenstein, Alvin J., and Joseph H. Kanner.** "Television in army training: Color vs. black and white." *Audio-Visual Communication Review* 9 (1961), 44–49.

Problem: Determine learning from color and black and white television.

Sample: 116 enlisted men, officers and civilians at the Ordnance Guided Missile School, Huntsville, Alabama.

Subject taught: Guidance and repair of Nike missile system.

Key variables: Color and black-and-white presentation; learning; ability.

Enlisted men, officers, and civilians were matched on the Army Mechanical Aptitude or the Army General Classification Test, and were assigned to color or black and white treatments. Both groups saw the same 15 lessons and took objective multiple-choice tests immediately after each lesson.

There were no significant differences between mean scores for any of the fifteen lessons between the two groups. When the subjects were divided into high- and low-ability groups there were no definite trends that either black and white or color was more effective.

254. **Rosselot, LaVelle.** *Evaluation of the Otterbein College film-text method of teaching French, at five Ohio institutions.* USOE Project SAE 8617. Otterbein College, Westerville, Ohio, Sept. 30, 1961. (Mimeographed).

Problem: Determine the relative effectiveness of using textbooks or films and textbooks in teaching French.

Sample: About 150 students from two colleges, Oberlin and Wooster; one senior high school, and one junior high school.

Subject taught: French.

Key variables: Listening and learning; film and text and text teaching methods.

Students took the OSPE, two ETS French tests, and an oral (taped) test.

For the college students, t-tests indicated no significant differences between experimental (film and texts) and control (texts) groups on OSPE scores, but students in the control group had significantly higher (.05 level) scores on the two ETS French tests. Experimental students had significantly higher scores on the oral (taped) test. These results were duplicated the second year of the experiment, except that there were no significant differences between groups on the ETS Cooperative French Listening Test (except students in the experimental group tended to have higher scores). Thus on the two listening instruments, students in the film and texts group achieved higher scores; on the reading instruments, the text groups achieved higher scores.

Similar trends (though often nonsignificant) were observed for the high school students the first year, but in the second year, high school students in the experimental group achieved significantly higher scores (.05 level) on nearly every instrument.

255. **Rothchild, Thomas H., and R. LeRoy Lastinger.** "The Florida West Coast Project for the Utilization of Television in Large Class Teaching: First Year Report, July 1959 to June 1960." NAEB Research Fact Sheet, Series I, 90, *NAEB Journal* 20 (January 1961), 1–2. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 6,689 students in elementary and secondary schools.

Subjects taught: Social studies, mathematics, United States history, biology, American problems.

Key variables: TV teaching, face-to-face teaching.

In six elementary schools each child spent 90 minutes in a large class with time divided equally between watching two TV lessons and working under supervision of classroom teacher. The large group was then divided into two or three sections for two 45-minute periods of work in physical education, art, music, and science. For the rest of the day each class was assigned to a skills classroom for face-to-face instruction in language arts, arithmetic, and reading. No report of the secondary school program is given.

Results.—(1) Students learn as effectively in large classes taught by TV as in large classes taught face-to-face. (2) Students accept TV large classes and say they work as hard or harder.

Report also includes description of teacher utilization under Stoddard plan organization.

256. ROTTMAN, LEON HARRY. "The effectiveness of high school television-correspondence instruction." *Dissertation Abstracts* 21 (1960), 2994.

Problem: Determine the relative effectiveness of television-correspondence and face-to-face presentations.

Sample: High school students.

Subjects taught: Algebra, geometry, chemistry, English, physics, general mathematics, art, and Spanish.

Key variables: Television-correspondence and face-to-face presentation; achievement, attitude, and ability level.

Students in all courses took standardized achievement tests and an attitude questionnaire on subject, presentation method, and teacher.

Analysis of covariance indicated no significant differences between presentation methods on students in general mathematics, physics, and art. There were no significant differences among geometry students at mid-year, but posttest scores of geometry students in small control classes were significantly higher than other groups. Algebra students in the experimental group had significantly higher mid-year scores than other algebra students. Spanish and chemistry students in the large school control group had significantly higher scores at mid-year and on the posttest. English students in the experimental group had significantly higher scores than students in the large and small school control groups on the posttest, but at the below-average ability level the small control group had higher scores.

In the subject matter evaluation, the control group students had a significantly higher rating than experimental students in all courses except English. In the presentation method evaluation, the control group students had a significantly higher rating in all courses.

257. RUMFORD, HERBERT PAUL. "An experiment in teaching elementary school methods via closed-circuit television." *Dissertation Abstracts* 21 (1961), 2994.

Problem: Determine the relative effectiveness of student achievement and to determine student attitude, with face-to-face and television presentation.

Sample: 30 students at a Kansas state teachers college.

Subject taught: Elementary school methods.

Key variables: Television and face-to-face presentation; Minnesota Teacher Attitude Inventory (MTAI), and Minnesota Multiphasic Personality Inventory (MMPI) scores, retention, and learning.

Thirty students were matched by age, sex, methods course experience, teaching experience, and raw scores on the Henmon-Nelson Test of Mental Ability and the MTAI. Students were then divided into two groups. Face-to-face students watched the lectures and classroom observations directly; television students received both the television lectures and classroom observations via closed-circuit television. The effectiveness of television for classroom observations was measured by scores on objective examinations and by scores on daily observation papers. The effectiveness of television in lecture content was measured by multiple-choice, teacher-made tests. Both groups also took the MTAI and two scales from the MMPI: the teacher prognosis scale and the Welsch A scale as pretests and posttests.

Televised lectures were as effective as face-to-face presentation in subject matter, when measured by teacher-made objective test scores. Observation by television was as effective as direct observation, when measured by teacher-made objective test scores, but was significantly less effective when high-ability students were measured separately. When scores on the daily observation sheets were used as a criterion, televised observation was significantly more effective than was direct observation. This was true of all ability levels. No significant differences in effectiveness for either television or face-to-face lecture or observation were found using final grades as a criterion, and no significant differences were found between television and face-to-face lectures from scores on an examination given four months after the semester ended.

Scores from the MTAI revealed no significant differences in teacher attitude, and scores on the selected MMPI scales revealed television students improved significantly in teacher prognosis, while face-to-face students did not. This difference was limited to the low-ability group when the groups were considered separately. Students in the television group did not show greater anxiety, as determined by the MMPI scale.

It was concluded that television was as effective as face-to-face methods in learning and attitude changes in the elementary school methods course.

See also "An experiment in teaching elementary school methods via closed circuit television." *Journal of Educational Research* 56 (1962), 139–143.

258. SADNAVITCH, JOSEPH M., and W. JAMES POPHAM. *Retention value of filmed science courses.* USOE Project No. 615. Pittsburg, Kansas: Kansas State College of Pittsburg, August 1961. (Mimeographed).

Problem: Determine the relative retention of students in filmed and face-to-face science courses.

Sample: 215 chemistry and 86 physics students in 12 high schools.

Subjects taught: High school physics and chemistry.

Key variables: Film and face-to-face presentation; learning and retention.

The year previous to this study, 247 physics students and 486 chemistry students from 12 southeast Kansas schools took year-long courses in physics and chemistry either by face-to-face or by daily 30-minute filmed (Encyclopaedia Britannica) presentations. The sample of students for this present study was drawn from those who had participated in the previous science films study and included 368 students (now seniors) of the original 733 from 12 schools. During this time 153 of the 215 chemistry students had been taught by film, and 63 of the 86 physics students had been taught by film.

Students took the Cooperative Physics Test or the Cooperative Chemistry Test, as well as the Otis Quick-Scoring MA Test. Students' grade-point averages and end-of-course achievement test scores from the previous year were also available.

At the end of the first semester of the year after students had taken the course (a 7-month interval), students took one form of the Physics (or Chemistry) test; at the end of the second semester they took another form of the test. Students were not notified beforehand of the testing operation.

Pearson correlations among the 7-month retention Chemistry test scores, the end-of-course achievement test scores, Otis MA scores, and GPA ranged from .41 to .72. A similar range was found for correlations among the 12-month retention test and the other measures. Pearson correlations among the 7-month Physics test scores, end-of-course achievement test scores, MA scores, and GPA ranged from .26 to .71. Correlations among the 12-month Physics test and the other measures ranged from .33 to .68.

Analyses of covariance (controlling on Otis MA scores, grade-point averages, and end-of-course achievement test scores for the previous year) were run for both the first and second semester testings.

There were no significant differences in scores on the retention instruments between students in face-to-face and film classes for either chemistry or physics. This finding was true for both the 7-month and 12-month retention intervals, except that scores of chemistry students in face-to-face classes were significantly higher (.05 level) than those of students in film classes on the 7-month retention interval.

259. SARGENT, LESLIE W. *A comparison of the short-term effects of certain types of television program materials.* USOE Grant No. 704084. Angwin: Pacific Union College, 1962. (Offset).

Problem: To determine the influence of kinescopes and films on capacity for mental work, the influence of suspense material, and reactions of students of different ages.

Sample: 230 eighth- and tenth-grade students from ten classrooms in four California towns.

Subjects taught: Colonial Williamsburg (44-minute color film), and two Westerns (28-minute kinescopes).

Key variables: Audiovisual materials (films) vs. conventional class as preconditioning for mental work (DAT test).

Students in each class were matched for sex and ability scores. Experimental students viewed one of the films, and then took a Differential Aptitude Test subtest; control students had a regular class, and then took the same subtest. The following day the treatments were reversed. Over 50 percent of the students in the classroom tended to make higher scores on the subtests when taken after a regular class, and less than 50 percent of the students tended to make higher scores on the subtests when taken after the films or kinescopes. This trend was observed for the abstract reasoning test, for the numerical ability test, and for the verbal reasoning test; for the educational and Western film, for high- and for low-ability students, for eighth-grade students and for males. For tenth-grade students and for females the percentage was significantly different (.05 level, Wilcoxon sign rank test) in favor of students taking the tests after the film.

For students in a class taught by a woman, male students tended to achieve higher subtest scores after the film and female students higher scores after the class. For students in a class taught by a man, both male and female students tended to achieve higher scores after the class.

Conclusion.—Film-related variations in the capacity of students to do mental work were found to be smaller than variations associated with normal teacher-to-teacher differences in the standard classroom.

260. SCHELLER, FRED, JR. "A comparative study of the differences in student attitudes toward history and chemistry television courses." *Dissertation Abstracts* 20 (1959), 2106.

Problem: Determine if there are differences in students' attitudes between history and chemistry courses.

Sample: 80 students from three state schools in Oregon.

Subjects taught: General chemistry and history of the United States.

Key variables: Students' attitudes; course.

Only all subjects were given a schedule of 43 questions by one interviewer.

Both chemistry and history students thought science courses were more desirable than other types of courses on television. Using visual aids and "nearness" of material appeared to influence students' attitudes positively. Students from all colleges wanted to see ITV courses offered more regularly. Students' attitudes toward ITV seemed to be lower on campuses where professors served as discussion leaders than where graduate students served as discussion leaders.

Chemistry students were not concerned about not being able to ask questions since they could do this during a recitation period. Chemistry students were generally more favorable toward their own ITV course, and toward ITV courses generally than were history students. History students were more concerned about lack of personal contact with the teacher. There may have been some local (college) differences to account for some of the differences between students' attitudes.

261. SCHLAAK, FRANKLIN OTTMER. "The planning, production and evaluation of two experimental series of classroom telecasts for use in the intermediate grades in the Columbus, Ohio, area." *Speech Monographs* 23 (1956), 121. (Abstract).

Problem: Determine the interests of pupils and teachers.

Sample: Teachers and pupils in the Columbus area.

Subjects taught: Science and art.

Key variable: Attitudes.

Only all 22 telecasts were evaluated by questionnaires, discussions with teachers, and pupil reactions noted by teachers.

Pupils and teachers tended to be more favorable to science and art after the series was presented.

262. SCHUELER, HERBERT, MILTON J. GOLD, and HAROLD E. MITZEL. *The use of television for improving teacher training and for improving measures of student-teaching performance. Phase I. Improvement of student teaching.* USOE Grant No. 730035. New York: Hunter College of the City University of New York, 1962. (Mimeographed).

Problem: Determine the relative effectiveness of kinescopes, kinescopes and personal visitation, and visitation only.

Sample: 24 student teachers the first semester, 12 the second, and 18 the third.

Subject taught: Student teaching.

Key variables: Kinescope, kinescope and observation.

Supervisors made personal visits, or directed the making of kinescopes of the student teachers' performances, or directed the making of kinescopes and then conferred with the student teacher. Student teachers were randomly assigned to one of these three treatments. Their performances were recorded by judging behavior on certain characteristics that were shown to have a stability coefficient of .40 or greater, and students were also interviewed.

There were no significant differences among scores on a behavioral instrument used to record performance of the student teachers in the three treatments. The authors noted a wide range of behavior characteristics of student teachers undergoing training, the effects of supervisors and classroom environment, and changes in the students' attitudes toward the teacher's role.

Supervisors preferred the kinescope and observation treatment to the other two treatments. The behavioral performance record was found to have some validity. The use of kinescopes as an instrument in educational research showed considerable promise.

263. SCHWARZWALDER, JOHN C. *An investigation of the relative effectiveness of certain specific TV techniques on learning.* USOE Project No. 985. St. Paul, Minnesota: KTCA-TV, September 1960. (Offset).

Problem: Determine the effect of visual continuity, reinforcement, and visual manipulation on learning.

Sample: 40 fifth-grade classes in St. Paul public schools.

Subject taught: Fifth-grade science.

Key variables: Visual continuity (planned and unplanned), visual reinforcement (supering or no supering), and visual manipulation (as in a lecture situation or as in a television situation).

Pupils from the 40 classes saw 72 kinescopes. They also took the Otis Quick-Scoring MA Tests, and eight objective content tests. Item difficulty and discrimination analysis were performed on the latter. Hoyt's r on the eight science tests varied from .58 to .82.

Analysis of covariance technique indicated that pupils generally did significantly better (.05 level) on the science content test when they viewed a kinescope that had planned continuity, visual reinforcement, and had been the result of a team approach to make effective use of the medium.

264. SCOLLON, ROBERT W., JR. Relative effectiveness of several film variables in modifying attitudes: a study of the application of films for influencing the acceptability of foods. Technical Report SDC 269-7-60. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1956.

See also: "A study of some communicator variables related to attitude restricting through motion picture films." Doctoral dissertation. Pennsylvania State University, 1956.

Problem: Effect of different prestige roles for film communicators in changing attitudes.

Sample: 311 Army quartermaster trainees.

Subject taught: Utilization and acceptance of individual combat ration (C ration).

Key variables: Prestige of communicator, level of identification of communicator, relationship of communicator to audience reference group.

Five versions of a film on the development and use of the C ration were produced. Common to all the films was a series of visual sequences on the contents, and development of the C ration. The variations were:

I. Basic film + anonymous narrator
II. Basic film + scientist narrator
III. Basic film + veteran narrator
IV. Basic film + anonymous narrator with interview with scientist added
V. Basic film with anonymous narrator with interviews with veterans added.

Attitude was inventoried on a specially constructed food survey questionnaire which measured acceptance of C rations. (Test-retest reliability correlation=.85.)

Seven groups of 60 subjects each were drawn from Quartermaster Corps school at Fort Lee, Va. Five groups were each shown a different version of the film. The first two groups were given a questionnaire as a pretest to serve as a control group.

Results.—(1) No significant difference in attitude change when a prestigeful narrator was used instead of an anonymous narrator, (2) identification of a narrator with the film had little effect on attitude change, (3) pretesting the film groups on attitude about subject before they saw the film reduced the effectiveness of the film to change attitudes, (4) some changes in attitude for the groups which saw the film were significantly different in favor of the C ration from pretest or control group attitudes, but this was not a consistent change, (5) the relationship of the communicator to the audience significantly changed attitudes.

Conclusions.—There appears to be some effect on attitudes when the narrator is identified with the film, but the most significant effect occurs when the narrator identifies with the audience reference group.

265. SCOTT, DONALD T. "Teaching high school physics through the use of films." *Audio-Visual Communication Review* 8 (1960), 220–221. (See also, "An analysis of teacher and student opinions of an experimental method of teaching high school physics through the use of films as compared to traditional methods." *Dissertation Abstracts* 19 (1959), 2813.)

Problem: Determine teacher and student attitudes toward teaching physics by films.

Sample: 1,298 Wisconsin high school students.

Subject taught: Films from the Harvey White *Introductory Physics* series.

Key variables: Film and face-to-face presentation; attitudes.

Students saw 81 of the 162 Harvey White physics films. Students and teachers took open-ended and "check type" questionnaires.

Students and teachers felt that some of the films could be shortened, but thought that many of the filmed demonstrations were valuable. Most felt the films went at too fast a pace. Students did not like learning physics from films as well as face-to-face methods, although students in the film series used the textbook less and paid greater attention in class. Teachers disliked having "another teacher." Teachers' attitudes on the whole were generally negative.

266. SEIBERT, W. F. "A brief report and evaluation of closed-circuit television in Mechanical Engineering 360." Audio-Visual Center, Lafayette: Purdue University. *Audio-Visual Communication Review* 6 (1958), 77. (Abstract).

Problem: Determine the relative effectiveness of face-to-face and ITV presentations.

Sample: A group of 46 students in ITV classes and other students in face-to-face classes.

Subject taught: Mechanical engineering.

Key variables: Learning and attitudes; ITV and face-to-face presentations.

Students in both groups took a 28-item achievement test and a 10-item questionnaire.

Achievement was about the same between the two groups.

Students' attitudes were somewhat unfavorable. Favorable responses included the value of TV demonstrations, comfort in TV classes, classroom discipline, and a general acceptance of TV for instruction. Unfavorable responses included inability to ask questions (although a talkback system was available), lack of opportunity to take notes in class, and lack of opportunity to know the teacher.

267. SEIBERT, W. F. *An evaluation of televised instruction in college English composition.* TVPR Report No. 5. Lafayette, Ind.: Audio-Visual Center, Purdue University, July 1958. (Mimeographed).

Problem: Determine the relative effectiveness of ITV and face-to-face instruction on learning.

Sample: 154 college students.

Subject taught: English.

Key variables: Attitudes, attitude change over time, and learning; ITV and face-to-face presentation.

The experimental group, divided into four viewing rooms, had two 50-minute ITV lessons and one face-to-face meeting conducted by a graduate student each week; the control group of four sections had face-to-face instruction entirely and was taught by four other teachers. The quality of the ITV teacher's presentations was quite high. All students wrote 12 themes, took tests on grammar, punctuation, diction, spelling, and five subtests of the Purdue English Training Test.

Students also were administered the Purdue Instructional Television Attitude Scale. Equivalent-form reliability coefficients from .77 to .89 and construct validity coefficients with an evaluative semantic differential scale of .59, .81, and .87 have been reported.

Since the initial assignment of students to treatments was not random, the groups were compared on two measures. The average scores of the experimental and control groups on the Freshman Orientation English Test were 109 and 123 (significant at the .001 level), and Freshman Orientation English theme grades for the experimental and control groups were 4.3 (about a D) and 6.7 (about a C–) respectively (also significant at the .001 level). Finally it was noted that 84 percent of the experimental group and 48 percent of the control group were males. Students were then matched, primarily on the first two measures given above. This yielded 41 matched pairs out of about 154 students originally.

Correlations between two independent graders on one theme for the four sections of face-to-face and ITV students ranged from –.056 to .704.

Analysis of variance on the average theme grades and achievement tests of face-to-face and ITV students in high, medium, and low ability levels indicated significantly greater average scores of face-to-face students in 7 of 25 comparisons.

There was some tendency for low-ability ITV students to do less well than low-ability face-to-face students.

The over-all attitude toward ITV of the ITV group was neutral, and *t*-tests indicated no significant differences in attitude scores between ITV and face-to-face students. Only one of six correlations between attitude scores and one of the achievement indices was significant ($r = -.342$ at the .05 level).

268. SEIBERT, W. F. *An evaluation of televised instruction in college freshman mathematics.* TVPR Report No. 6. Lafayette, Ind.: Audio-Visual Center, Purdue University, July 1958. (Mimeographed).

Problem: Determine the relative learning and the attitudes of students in television and face-to-face classes.

Sample: 160 college students.

Subject taught: Freshman mathematics.

Key variables: Learning and attitudes; ITV and face-to-face presentation.

The experimental group had 25 to 30 minutes of ITV taught by the instructor and 25 minutes of face-to-face discussion led by a graduate student. The control group had 50 minutes of face-to-face instruction taught by another instructor. Instructors switched places halfway in the semester. The face-to-face group was in one lecture room and the ITV students were put into four rooms. All students took six achievement tests during the semester and the Purdue Instructional Television Attitude Scale after the semester. Equivalent-form reliabilities from .78 to .89 have been reported, and construct validity estimates of .59, .81 and .87 for Form A have been found.

The *t*-tests for uncorrelated means were run between ITV and face-to-face students for each of the six achievement measures; only one of the comparisons was significant (favoring ITV students at the .01 level).

The overall attitude toward ITV of the ITV group was neutral, and *t*-tests indicated no significant differences in attitude scores between ITV and face-to-face students. Only one of 14 correlations between achievement and attitude scores was significantly greater than zero.

269. **Seibert, Warren F., and Jurgen M. Honig.** "A brief study of televised laboratory instruction." *Audio-Visual Communication Review* 8 (1960), 115–123.

Problem: Determine the effect on learning of ITV and face-to-face presentation.

Sample: 60 college psychology students.

Subject taught: Chemistry.

Key variables: ITV and face-to-face presentation, immediate and laboratory delayed performance, and learning.

Students were assigned to one of five experimental treatments: (1) television laboratory instruction with posttest within 2 hours, (2) television laboratory instruction with posttest after 5 weeks, (3) face-to-face laboratory instruction with posttest within 2 hours, (4) face-to-face laboratory instruction with posttest after 5 weeks, and (5) no laboratory instruction.

All subjects were pretested with a 24-item multiple-choice vocabulary test (K–R #20 $r=.74$). Subjects were then divided into face-to-face and ITV presentations. Delayed posttest subjects were released after the presentation, and the remaining students took an 18-item knowledge test (K–R #20 $r=.67$). Finally, the remaining students performed a titration and their performance was evaluated by laboratory assistants. (One correlation of evaluations of lab assistants working semi-independently was .89.) The delayed posttest and control groups performed their titrations and took the knowledge test 5 weeks later.

An analysis of variance indicated no significant differences between the ITV and face-to-face groups for either the immediate or delayed post knowledge tests. The delayed ITV group had significantly lower (.05 level) lab performance evaluation scores than the ITV immediate, or face-to-face immediate or delayed groups.

270. **Sheehan, A. Cornelia.** "The interrelations of interests and attitudes and specified independent variables in the teaching of natural science by television in the fifth grade." *Dissertation Abstracts* 21 (1961), 2855–2856. (Compare studies by Gerard T. Amirian, Homer Justin Dietmeier, and Mary Elizabeth Kraft.)

Problem: Determine what attitude changes toward science and scientists occur on fifth-grade science by television.

Sample: 90 fifth-grade classes in towns around Boston.

Subject taught: Fifth-grade natural science.

Key variables: Teacher training, study guide utilization, class participation, individual projects, student ability and television presentation; attitude scores and activities.

All pupils took four specially constructed instruments (an interest inventory, an attitude checklist, a leisure activities checklist, and a television-viewing checklist) before and after viewing the 30 half-hour programs of natural science. All 90 classes viewed the series. Eighteen classes served as a control group, 24 classes had teachers trained in the utilization of television, 24 had teachers trained in elementary science, and 24 of the class teachers had no special training. Half of the 72 classes comprising the experimental group used the television series to begin the unit each day, and half used the series to end the unit each day. Half of the teachers received study guides, and half did not. Half of the classes worked on common class assignments and half of the classes worked on individual projects.

Analysis of variance technique showed an overall loss of interest in science at the end of the series, notably in the experimental group, for the girls, and for the higher ability pupils. Associated with this were significant interactions in teacher training, initial-final use of television, and type of class assignment. Students gained more realistic perceptions of scientists and became significantly less favorable in attitude toward science and scientists. Factors as similarity to adult and peer values, initial uncertainty, original realism, and original attitude appeared to be more related to attitude toward science than television or any of the experimental treatments. No significant differences were found between control and experimental groups in leisure-time activities; there was a slight tendency for science-related activities to decrease. For girls, teacher training and type of class assignment had an influence on gains in science-related leisure activities. Pupils having a high interest in science presumably watched more science-related television programs.

271. SHELDON, WILLIAM, FRANCIS E. ALMSTEAD, and RAYMOND W. GRAF. "Talkback, the missing ingredient." *Audio-Visual Instruction* 5 (April 1960), 112.

Problem: Comparative effectiveness of talkback-equipped TV and face-to-face methods of instruction for reading achievement.

Sample: Not given.

Subject taught: Reading achievement, Grades 4 and 6.

Key variables: Scores on Iowa Test of Basic Skills, Form II; TV-taught and face-to-face taught students.

See Summary No. 8.

272. SHETTEL, H. H., and others. "An experimental comparison of 'live' and filmed lectures employing mobile training devices." *Audio-Visual Communication Review* 4 (1956), 216–222.

Problem: Determine the relative effectiveness of film and live lectures using mockups.

Sample: 165 Air Force technicians.

Subject taught: B-47 (airplane) maintenance.

Key variables: Film and face-to-face presentation, learning, retention.

Servicemen were divided into two groups. One group saw maintenance films and the other group saw the films' lecturer in a face-to-face situation. In both, a variety of mockups were used to demonstrate the functions of the various systems. All servicemen took a pretest, an immediate posttest, and a delayed (6 to 8 weeks) posttest on the content for each presentation. For one of the comparisons, the delayed posttest group was divided: one part saw the film again before the delayed posttest and the other part did not.

The *t*-tests indicated that scores of men in the face-to-face situation tended to be slightly higher on the immediate posttest than the film group. There were no differences between scores of the two groups on the delayed posttest. The scores of those men who had seen the film a second time just before the delayed posttest were as high as they had been for the initial posttest.

The authors conclude that in view of the economy, ease of transportation, and saving in manpower, the use of lectures with elaborate mockups be discontinued in favor of film presentation.

273. SHIMBERG, B. *Effectiveness of Television in Teaching Home Nursing.* Princeton: Educational Testing Service, Research Bulletin RB–54–19, (1954). (Duplicated).

See also: Shimberg, B., and E. L. Aird. "Effectiveness of TV in teaching home nursing." *Nursing Research* 4 (1955), 28–41.

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 337 Red Cross volunteers.

Subject taught: Home nursing.

Key variables: Learning, TV teaching, TV teaching plus practice sessions, face-to-face teaching, student attitudes.

Two experimental and one control group were used: (1) TV-only which received all instruction via TV. (2) TV-plus-practice which received in addition to the TV instruction a weekly practice session. (3) Classroom group which was taught the course face-to-face. The two TV groups received 13 half-hour programs twice a week. The face-to-face group attended seven two-hour sessions composed of lectures, demonstrations, and supervised practice. Subjects were volunteers from organized groups in Houston and Oklahoma City. The TV groups were in Houston. The TV-plus-practice group also met at a local center for one hour of supervised practice every Wednesday. The face-to-face group met in Oklahoma City. Effectiveness was measured by comparisons between groups both on a battery of pretests and a similar battery of posttests. A criterion of seeing 8 or more of the 13 TV presentations was set as a definition of regular viewers, the number was 77 for TV-only and 43 for TV-plus-practice. Face-to-face group number was 217.

Findings.—Television instruction was found to be as effective as classroom instruction in teaching facts about home nursing. Students taught by TV did almost as well on the performance test as those taught face-to-face, although total time spent was less for the TV students. The average TV student spent between 5 and 6 hours in front of the TV set, while the average face-to-face student spent 12 hours in class. No significant differences were found between the TV-only and TV-plus-practice groups in terms of performance test scores.

The attitude of those who viewed the TV programs regularly was overwhelmingly favorable toward TV instruction. Questionnaire answers indicated that more participation and more satisfaction might ensue from such a course if (1) the course were presented at a more convenient time, (2) the course were shortened, (3) the practice sessions were better organized, (4) students were presented with a study guide or course outline, and (5) the course took into consideration the specific home health needs and interests of the audience.

274. SILAGYI, DEZO VINCENT. "A critical analysis of attitudes of selected elementary students toward television teaching in the Detroit television teaching project." *Dissertation Abstracts* 22 (1961), 128.

Problem: Determine attitudes of third- to sixth-grade pupils to ITV.

Sample: 2,840 pupils in eight Detroit schools.

Subjects taught: Third-grade French, fourth-grade Spanish, fifth-grade Spanish, science and health.

Key variables: Grade-level course; attitudes.

All pupils took an attitude questionnaire. Chi-square analysis was used for tests of significance.

Pupils indicated it was easy to learn by television, that they liked to discuss television lessons with their teachers, that they did not become restless during a televised lesson, and that they had to listen more carefully to a television teacher than one in the classroom. French, fourth-grade Spanish and science were ranked in the upper half of the continuum; fifth-grade Spanish and health were ranked in the lower half.

Pupils were not bothered by the five TV sets in the auditorium; about half preferred to watch in their home room, however.

Pupils were pleased that the viewing teacher knew their names and was familiar with the work they were doing in television classes, that they could get help if they couldn't understand the TV lesson, and that the ITV teacher talked directly to them. They reported that their neighbors did not bother them any more in their TV classes than in their face-to-face classes, and their friends thought they were "lucky" to be in a TV class.

Pupils felt they were learning as much on TV as they would in a face-to-face situation. They felt TV helped to make the lessons more understandable and that television helped them see more clearly.

275. SKINNER, THOMAS DIBBLE. "An experimental study of the effects of prestige and delivery skill in educational television." Abstract of doctoral dissertation, University of Michigan, Ann Arbor, 1963.

Problem: Determine the effects of prestige and delivery skill on ETV.

Sample: Not indicated.

Subject taught: American history.

Key variables: Good and poor speeches on kinescope; learning and retention.

An actor was trained to perform as both a good and a poor speaker. He recorded two versions of a 15-minute American history lecture by kinescope. In the good speech-delivery version, he was introduced as a person of high prestige; in the poor speech-delivery version as a person of low prestige. Viewers filled out a content completion test immediately and after 4 weeks, and also filled out a semantic differential instrument to determine the relationship of the viewed speaker to the subjects ideal speaker.

Analysis of the data indicated no main effect for the prestige variable. A supplemental experiment indicated no significant differences between the two perceived prestige images supposedly created by the two introductions.

Good speech delivery produced significantly higher immediate and delayed retention scores than did poor delivery. Subjects rated the good speaker as being significantly closer to their ideal than the poor speaker.

276. **Slattery, M. Jamesetta.** *An appraisal of the effectiveness of selected instructional sound motion pictures and silent filmstrips in elementary school instruction.* Washington, D. C.: The Catholic University of America Press, 1953. 67 p.

Problem: Determine the relative effectiveness of filmstrips and sound motion pictures.

Sample: 422 fifth-grade pupils from nine Rochester, New York schools.

Subject taught: Social studies.

Key variables: Learning, intelligence, participation; presentation by sound pictures and filmstrips.

Silent filmstrips and sound motion pictures both increased learning of fifth-grade pupils, but filmstrips produced significantly greater learning than the sound motion pictures. Participation in filmstrips did not seem to increase learning significantly. Pupils of higher intelligence levels attained correspondingly higher scores.

277. **Smith, Herbert A.** "Intelligence as a factor in the learning which results from the use of educational sound motion pictures." *Journal of Educational Research* 46 (1952), 249–261.

Problem: Role of individual intelligence in learning from films.

Sample: 1,298 students.

Subjects taught: American history, world history, general science.

Key variables: Intelligence, learning, film teaching, face-to-face teaching.

In eight schools, 105 students placed in a control group and 245 students in 12 schools as an experimental group were taught American history by face-to-face and film methods of instruction respectively. In ten schools 181 students in a control group and 415 students in 13 schools as an experimental group were taught world history by face-to-face and film methods of instruction respectively. In eight schools 150 students as a control group and 207 students in 11 schools as an experimental group were taught general science by face-to-face and film methods of instruction respectively.

All students were given the California Test of Mental Maturity, Advanced Form 47s, as a measure of intelligence. Student achievement was measured on cooperative tests published by the American Council on Education and special tests of film content. Achievement tests were administered in a pretest posttest design.

Results.—Correlations were calculated for each class in each school for (1) gain on film test and language, nonlanguage and total scores on the CTMM and (2) between gain on the standardized test and the three scores on the CTMM. Correlations were tested for significance and 18 of the 21 differences in the comparisons favored the film-taught group.

Conclusions.—The author says that the study does not support the hypothesis that dull students learn more from films than bright students. The correlation between intelligence and gain in information tended to be significantly different than zero; therefore, students with high ability learned or gained more from the films than did equally intelligent students in face-to-face sections. Failure of previous studies to demonstrate this same effect are caused by tests with a ceiling too low for accurate measurement of performance of high-ability students.

278. **Smith, Hope M., and Marguerite A. Clifton.** *The viewing of oneself performing selected motor skills in motion pictures and its effect upon the expressed concept of self in movement.* USOE Grant No. 704105. Los Angeles: University of California, August 1961. (Mimeographed).

Problem: Determine if one's concept of his skill changes after viewing films of himself.

Sample: 75 college students between 17–21.

Subject: Motor skills and self-assessment.

Key variables: Self-perception of motor skills, viewing films or not viewing films; viewing individually or in groups.

Each subject performed five motor skills: (1) walking, (2) running, (3) catching volleyballs, (4) throwing beanbags at a target, and (5) making standing broad jumps. They then filled out a self-perception checklist. Some performed individually and some in small groups. After 4 weeks each saw unedited film loops of his previous performances, then filled out the self-perception checklist again. Control groups repeated their performances the second time and did not see films.

The *t*-tests indicated that the experimental *S*s evaluated themselves significantly more favorably in throwing after viewing the films than they had in the pretest. Those viewing a film of themselves as part of a group had no significant differences between pre- and post-viewing self-perceptions.

Those who viewed individual films of themselves had significantly more positive self-perceptions about catching (.05 level) than those who viewed group films. There were no significant differences on the posttest between the self-perception scores of men and women. There were significant differences between the women athletes and nonathletes in three skills after the initial performances, but in only two skills after viewing the films. There were no significant differences between male athletes and male nonathletes at either testing time.

279. SNYDER, VANCE BEIDEL. "Use of teacher-produced instructional films in industrial arts education: A study to determine the effectiveness of teacher-produced instructional films in teaching perceptual motor skills in a public school industrial arts shop." *Dissertation Abstracts* 22 (1961), 506–507.

Problem: Determine the relative effectiveness of teacher-produced films and face-to-face demonstration techniques.

Sample: 32 high school students.

Subject taught: Industrial arts.

Key variables: Film and face-to-face demonstration; motor skills evaluations.

Two groups were selected at random to serve as experimental and control groups. Both were matched in reading ability, mechanical ability, and previous industrial arts experience. Experimental students saw film demonstrations, and the control group saw face-to-face demonstrations. Both students then completed projects which were evaluated by a panel of judges.

It was found that of 43 operations evaluated, 32 showed no significant differences between the two groups, and 11 showed higher rankings in favor of the control students.

280. SOUDER, MARJORIE, and others. "Study of the effectiveness of televised instruction in a physical education course." Urbana: University of Illinois, Department of Physical Education for Women and Office of Instructional Television, 1962. NAEB Research Fact Sheet, Series I, 109, *NAEB Journal* 22 (1963), 1–2. (Abstract).

Problem: Comparative effectiveness of TV and face-to-face instruction.

Sample: Freshman and sophomore college students (*N* not given).

Subject taught: Women's physical education.

Key variables: TV teaching, face-to-face teaching, experience of classroom supervisors, attitudes toward physical education and basic movement.

A battery of motor fitness tests was administered at the beginning of each semester of a three-semester project to students taught physical education by TV and face-to-face methods. A written objective examination and an attitude inventory were given at the end of each semester to all students. Data from pretests and posttests were analyzed by analysis of covariance with adjustment for initial ability.

During semester I, classes which met for the first two periods of the day were rotated each week between a TV-originating room and a TV-receiving room. Classes meeting in the next two periods did not rotate. All receiving-room classes were supervised by two senior physical education students.

In the second semester, all lessons were televised live by two experienced instructors. During the first hour of the day, one-half the class was taught by TV while the other half was taught face-to-face. Roles were reversed for the second hour. Graduate assistants met with each group to conduct routine class procedures.

During the third semester, TV sections were taught by video-taped lessons for 15 minutes, and by either experienced or inexperienced instructors for 15 minutes after the TV presentation by face-to-face methods of instruction. Two control sections were taught face-to-face for the whole period by experienced instructors.

Results.—Motor fitness objectives were more adequately met by face-to-face teaching than TV teaching during the first semester. There was no significant difference between methods of instruction for the second semester for motor fitness, but there was a significant difference (.05 level of confidence) favoring the TV-taught section for routine movements. In the third semester, for motor fitness objectives, TV-taught sections with experienced face-to-face instructors in the receiving rooms were significantly better (.01 level of confidence) than students in sections taught entirely by face-to-face methods of instruction.

No significant difference between methods of instruction was found for attitudes toward physical education or basic movements.

281. SOUTHWESTERN SIGNAL CORPS TRAINING CENTER AND CAMP SAN LUIS OBISPO, CALIF. "Instructor-student contact in teaching by television." Training evaluation and research programs, Part IV, Training Research Programs. July 1, 1953. *Audio-Visual Communication Review* 3 (1955), 304–305. (Abstract).

Problem: Determine trainees' attitudes towards various talkback systems.

Sample: 60 trainees.

Subject taught: Preparing the Joint Message Form.

Key variables: TV instructor with a studio class and no talkback system with other TV classes, TV instructor with a studio class and a talkback system (telephone type handsets), and TV instructor with no studio class and with a talkback system (walkie-talkie).

It was concluded that trainees did not prefer the studio with no talkback treatment, that they were kept alert when questioned over a talkback system, and that an in-studio class was desirable from an instructor's viewpoint.

282. SPENCER, R. E. Comparisons of televised with teaching machine and televised with instructor presentations of English grammar, *Comparative Research on Methods and Media for Presenting Programed Courses in Mathematics and English,* C. R. Carpenter and L. P. Greenhill, editors. USOE Grant No. 736116. University Park: The Pennsylvania State University, March 1963. p. 57–63.

Problem: (1) Determine the relative effectiveness of a programed course televised with a programed course taken on individual teaching machines; (2) the relative effectiveness of a programed course televised with face-to-face instruction, and (3) students' attitudes.

Sample: 43 high school juniors and seniors and 30 college students who had scored below 45 on the Penn State English Placement Test (lower range of the score distribution).

Subject taught: English grammar.

Key variables: Learning from programed courses presented individually, on television, and in face-to-face lectures.

High school students were randomly assigned to televised programed instruction or teaching machine instruction groups. College students were randomly assigned to televised programed instruction or to face-to-face instructor groups. The grammar classes were supplementary to the basic English course and met twice a week. Television students responded to each question as it appeared on the screen and were instructed to check their answer with that on the screen. Each frame lasted about 30 seconds. The face-to-face group covered the same topics, but the lecturer was free to teach as he wished.

All students took the Penn State English Placement Test (corrected split-half $r=.73$) as a pre- and posttest. In addition, the sum of scores on unit tests (K-R #21 $r=.84$) was available.

The differences between the two high school groups on the English Placement pretest were not significant. High school students in the programed instruction by TV group had significantly higher scores on the English Placement posttest than pretest (.01 level). High school students in the individual teaching machine group tended to have higher scores on the posttest than the pretest (.05-.10 level). There were no significant differences between the high school TV and teaching machine groups on any of the criterion measures.

The differences between the two college groups on the English Placement pretest were not significant. Both college TV and face-to-face groups had significantly higher scores on the English Placement posttest than the pretest (.01 level). There were no significant differences between the college TV and face-to-face groups on any of the achievement measures. Students in the face-to-face group had more positive attitudes toward their method of instruction than did students in the TV group, as determined by scores on a 54-item (K-R #20 $r=.64$) test.

283. Spigle, Irving Samuel. "The cumulative effect of selected educational motion pictures on the attitudes of high school boys and the relationship of attitude changes to selected personality and intelligence factors." ***Dissertation Abstracts*** **15 (1955), 2066.**

Problem: Determine the relationship of personality traits and intelligence to attitude changes from viewing films.

Sample: 79 high school senior boys in one Indiana town.

Subject taught: Preparation for armed forces service.

Key variables: Attitudes, personality factors, intelligence; film presentation.

Two groups of high school boys took a 24-item test designed to measure attitudes toward the armed forces. A week later, four 11-minute films on preparation for service were shown with a minimum of introduction to one group for four consecutive days. On the fifth day both groups took the attitude scale again. Grade averages and scores on the American Council on Education Psychological Examination (ACE) and the Primary Mental Abilities (PMA) test were available for all boys. The experimental group also took the Bernreuter Personality Inventory.

Scores on the post-attitude scale of the experimental group differed significantly from the control group. The group which moved in a favorable direction from pre- to posttest on the attitude scale had a significantly higher initial attitude score than the group which moved in an unfavorable direction. The group which was unfavorable toward the armed service on the posttest had significantly higher scores on the quantitative measure of the ACE than the group which was favorable. Other ratings of intelligence, or grades, or personality had no relationship to attitude changes from the films.

284. Stake, Robert E. ***The effect of television instruction on individual learning curves.*** **USOE Project No. 573 (8190). University of Nebraska, November 1959. (Mimeographed).**

Problem: Determine the relative learning curves for students learning by face-to-face and ITV.

Sample: 127 control Nebraska high school students and 23 ITV students. (Also a college group of 14.)

Subject taught: Spanish (elementary vocabulary).

Key variables: Face-to-face and ITV presentation; learning rate, regularity of achievement, and final achievement.

No attempt to coordinate curricula was made in the several high schools included. Students took a 15-minute 40-item test every 2 weeks. Items from the Educational Testing Service Cooperative Spanish Tests were used.

There were no significant differences in scholastic aptitude (SCAT) between experimental and control groups. Learning rates (radius of curvature of the learning curve) and regularity of performance (discrepancy of individual performance from the theoretical learning curve) were not significantly different for the two groups.

ITV students had significantly lower achievement scores at the end of the course than either the large or small control groups. The ITV students appeared to start learning vocabulary more slowly and never caught up. The author reports that a number of the ITV students said flatly that they did not like the ITV teacher.

285. STARLIN, GLENN, and JOHN E. LALLAS. *Inter-institutional teaching by television in the Oregon State System of Higher Education. Report No. 1—1957–59.* Eugene: Oregon State System of Higher Education, March 1960.

Problem: Determine the relative effectiveness of ITV at originating and receiving institutions, compare ITV and face-to-face instruction, and determine student and faculty attitudes toward ITV.

Sample: See below.

Subjects taught: U. S. history, appreciation of literature, English composition, educational psychology, school in American life, human development, and chemistry.

Key variables: Learning, ability level, attitudes, discussion leader, originating and receiving institutions; ITV and face-to-face instruction.

Achievement

For the following courses, the ITV lectures were telecast simultaneously to students at the originating institution (OI) and at the receiving institution (RI). The discussion sections at the OI were conducted by the ITV teacher; discussion sections at the RI were conducted by the RI staff.

U. S. history

A *t*-test on final course examination means between 117 OI students and 54 RI students for the first term was not significant. A *t*-test on course examination means between 115 OI students and 64 RI students for the second term was significant (.05 level), favoring OI students.

Educational psychology

A *t*-test on final course examination means for spring term between 77 OI students and 105 RI students was not significant.

Appreciation of literature

Analysis of covariance controlling on Ohio State Psychological Examination scores on midterm and final course examination means of OI and RI students for nine tests resulted in significant F ratios for the first four of the nine tests, all favoring OI students. The number of ITV literature students at the OI ranged from 75 to 101, and at the RI from 25 to 36 students.

For the following courses, the discussion sections on originating institutions were led by an OI professor, and those on RI campuses were led by RI professors. The ITV teacher did not have a discussion section.

School in American life

Analysis of covariance controlling on ACE scores indicated no significant differences on final course examination scores between OI and RI students. There were 191 OI students and 122 RI students.

Human development

A *t*-test indicated no significant differences between OI and RI students on midterm scores. There were 39 OI students and 231 RI students. An analysis of variance indicated no significant differences between OI and RI students on final examination scores.

Chemistry

Analysis of covariance, controlling on ACE scores, and *t*-tests indicated that OI students had significantly higher examination scores (.05 level) than RI students for 4 of 17 comparisons. In two comparisons the RI students had higher scores. The size of OI classes ranged from 78 to 121 and the size of RI classes ranged from 23 to 53.

The following courses were offered completely by ITV; there were no discussion sections.

U. S. history

The *t*-tests indicated no significant differences between OI and RI students for the midterm, but OI students had significantly higher final scores (.05 level) than RI students. There were 88 OI and 50 RI students.

Chemistry

Analysis of covariance, controlling on ACE scores indicated that, in six comparisons, OI students had significantly higher examination scores (.05 level) than RI students for the midterm of each of the three terms, but there were no differences in the final examinations. OI classes ranged from 59 to 71; RI classes ranged from 36 to 39.

In the following courses, face-to-face and ITV presentations were compared using achievement scores.

Human development

Three *t*-tests indicated no significant differences for any of three examinations between face-to-face and ITV students. There were 30 face-to-face and 38 ITV students.

Chemistry

Analysis of covariance controlling on ACE scores indicated only one significant difference (.05 level) on the first fall midterm mean scores between face-to-face and ITV students (favoring the former) out of six comparisons. Face-to-face classes ranged in size from 47 to 64, and ITV classes from 78 to 121.

Educational psychology

An analysis of variance on final examination scores between face-to-face and ITV students indicated no significant differences. There were 117 face-to-face students and 77 ITV students.

Attitudes

Thirty-seven ITV students in human development took the MTAI before and after the course. Changes were significantly more favorable, as indicated by a *t*-test (.01 level).

Two Likert instruments were developed. One having a core of 14 items had a split-half reliability of .85 ($n=150$); the other had a split-half r of .96 ($n=150$). A sample of 65 free response comments correlated (tetrachoric) .89 with one of the Likert instruments. Interviews ($n=58$) correlated (r tetrachoric) $=.95$ with one of the Likert instruments.

Chi square was used to analyze attitude data; "no" and "oppose" responses were combined. Pre-experimental attitudes of students toward inter-institutional television instruction and face-to-face instruction were generally nonsignificant among institutions.

A chi square run on responses of students of various institutions in human development, history (winter term), chemistry (fall term), appreciation of literature (both terms), and English composition (fall term), showed significant differences (.05 level) in students' attitudes toward ITV.

Students felt that ITV lectures were at least as good as face-to-face lectures, but were divided on the relative standards of student achievement, and reported that student-teacher relationships were less adequate in ITV than face-to-face classes. Demonstrations and visual aids seemed related to favorable comment. Chemistry and appreciation of literature students were more favorable toward ITV than were English composition students. Attitudes over a period of time seemed relatively stable.

Correlations between attitude scores and ACE scores, between attitude scores and California Personality Inventory scores, and between attitude scores and sex generally indicated no relationship, except that for the second year of research, in which women scored slightly more favorable than did men.

Attitudes of faculty members toward inter-institutional instruction by television ranged from highly approving to strongly disapproving. A greater percentage of faculty members opposed rather than accepted the idea of television teaching.

286. Starlin, Glenn, and John E. Lallas. *Inter-institutional teaching by television in the Oregon state system of higher education.* Eugene: Oregon State System of Higher Education. Report No. 1: 1957–59 and Report No. 2: 1959–61.

Problem: Feasibility of inter-institutional teaching by television.

Sample: 4,768 college students in report #1; 5,642 college students in report #2.

Subjects taught: School in American life, educational psychology, chemistry, American history, appreciation of literature, English composition, introductory geography, hygiene, astronomy, accounting, biology, romantic poets, and meteorology.

Key variables: TV teaching, face-to-face teaching, student achievement, faculty and student attitudes.

Students in four Oregon institutions of higher education were taught regular college courses by television. Teaching sessions of each course originated on one of four campuses and were received simultaneously, by open-circuit telecast from educational TV station KOAC, Corvallis, Oreg., in classrooms on all four campuses. TV instruction was generally supplemented by face-to-face instruction in the classrooms, but for some courses TV was used as the total teaching medium. The variables in teaching methods were (1) total TV teaching, (2) TV teaching with supplementary face-to-face teaching, (3) guest speakers in classrooms plus TV teaching, and (4) TV teaching with team-taught face-to-face supplementary sessions.

Variables were controlled by constructing achievement tests of the TV-taught material only. Achievement comparisons were accomplished by comparing scores on the tests by analysis of variance, analysis of covariance with adjustment for scores on the Minnesota Scholastic Aptitude Test, and *t*-test techniques. Student and faculty attitudes were determined by interviews, questionnaires, attitude inventories, and controlled observations.

Conclusions for 1957–59 period.—In the first report, the authors found no significant differences between the methods of instruction. There was some evidence that students on the originating campus did somewhat better than the students on the receiving campuses for the same course, but this effect was not borne out in the second report. (See below.) Student attitudes toward TV as a means of instruction are based on the same factors of like and dislike which determine attitudes in face-to-face classes. Students accept instruction from teachers on other campuses as well as teachers from their own campus. Full-time faculty members disliked assignment to supervising duty in TV-receiving classrooms and graduate students were found able to perform the supervising duty well.

Conclusions for the 1959–61 period.—During the first period there was some indication that students on the originating campus did better in terms of achievement than students on the receiving campuses. The authors felt, if such a difference did exist, it might be due to a number of factors, including greater accessibility of the TV teacher to students, an ability developed through contact with the teacher by students to predict examination questions, increased student motivation from contact with TV teacher, and greater student familiarity with the examination policies and procedures on the originating campus. Using analysis of variance and analysis of covariance techniques with a control for year in school, sex, and academic ability, these hypotheses were subjected to authors' investigation during the 1959–61 period and were reported in the second report.

From the second study, the preponderant conclusion was that the institutional origin does not affect student achievement. The differences favoring the students on the originating campuses appear to be due to chance and not the method of instruction. Several of the differences were found in the fall semester and disappeared in the spring semester. The authors attribute this to a lack of familiarity with the method of instruction. The difference in achievement between freshmen and upper-classmen was found to be significant in a number of cases for all methods of instruction and the authors point out that this difference appears to be as important as individual differences in ability.

General conclusions.—From the 6 years of study, the authors concluded that students on all campuses learned equally well when taught by television from one campus. Students also learned as well when taught by television as when taught by face-to-face methods.

287. STAUB, NORMAN C., and IRVING R. MERRILL. Measuring achievement in science reasoning about physiology. Theo. S. Grant and Irving R. Merrill, *Television in Health Sciences Education.* USOE Project No. 064. San Francisco: University of California, San Francisco Medical Center, Sept. 30, 1963. p. 22–27. (Offset).

Problem: Determine the relative effectiveness of presentation methods on learning, as measured by a science reasoning instrument.

Sample: 63 second-year University of California pharmacy students.

Subject taught: Physiology 105 (mammalian physiology).

Key variables: ITV presentation, lab demonstrations, and individual readings; science reasoning and specific information scores.

Students were assigned to one of three groups:

ITV presentation, laboratory demonstrations, and a group which read original reports of the experimental demonstrations in library. Each experimental group received six hours of instruction, and students were not permitted to ask questions about significance of data (done to decrease teacher variation).

Five days later all students took a 60-item multiple-choice test having 30 items of science reasoning (R) and 30 items of specific information (I). Of the total 60 items, 36 were verbal multiple choice (V) and 24 were pictorial multiple choice (P).

Hoyt's *r* for the R items was .62, for the I items was .42, for V items was .55, and for P items was .54. Content validity was assessed by having two faculty members agree that the items were appropriate to course objectives. Item discrimination was determined by having two faculty members agree on items on which students frequently go astray.

Students doing library reading had a smaller mean score on the instrument than students in the other two groups, but the difference was not statistically significant. The latter two groups did not score significantly higher on the pictorial items than the reading group.

288. STEIN, J. J. The effect of a prefilm test on learning from an educational sound motion picture. Technical Report 269-7-35. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1952.

Problem: Can pretest of film content increase learning?

Sample: 6,034 U. S. Navy recruits, Great Lakes Naval Training Station.

Subjects taught: Weather, measuring instruments.

Key variables: Knowledge of pretest scores, type of questions on pretest, order of questions on pretest, posttest scores, learning, retention.

Two similar experimental studies were conducted. Each used different persons, a different film, and different tests. There were 17 groups in each study of which 7 were experimental and 10 were control groups.

The hypothesis tested was that knowledge of items on which a student was to be tested after seeing a film would increase learning from the film. Selected groups of recruits, matched on scores on the Navy General Classification Test, were given a test on material that would be covered in a film they would see. They then saw the film and were given the test again. Some groups were told how many questions they had answered correctly before they saw the film, and some were told the correct answers for all items on the pretest before they saw the film.

Some recruits were given tests whose questions were in the same order that the material was shown in the film, and others were given questions in random order. Some recruits were given posttests identical to pretests and others were given posttests similar, but not identical, to the pretests. Some recruits saw the film twice and others saw it once. All posttests were given immediately after viewing the film, but some posttests were repeated one week later to measure retention. For all the experimental conditions a matched control was selected.

Results.—Using analysis of covariance, the most effective means of instruction was found to be a complete knowledge of the result of the pretest, with questions ordered in same manner as material to be presented, and a posttest identical to the pretest.

Conclusions.—The author concludes that administering a prefilm test, which has identical, ordered items, with a complete knowledge of the results of the pretest, followed by immediate viewing of the film will result in more learning from the film than showing the film once or twice. The effectiveness of a pretest depends upon giving students (1) a test identical to the posttest, and (2) immediate knowledge of the student's performance on the pretest.

289. STEIN, SARAH CHRISTINE. "An experimental study of the use of motion picture film loops in the instruction of beginning typewriting." *Dissertation Abstracts* 19 (1959), 3253.

Problem: Determine the relative effectiveness of using film loops in teaching typewriting.

Sample: Oregon junior and senior high school students.

Subject taught: Typewriting.

Key variables: Film loops and face-to-face presentations; typing speed and accuracy, and grade level.

Senior and junior high school classes were assigned to experimental and control treatments. Students in the experimental treatment saw 16 film loops as part of their instruction, and students in the control section had face-to-face instruction only. Students took straight copy—timed typewriting tests at various times throughout the course and a final test.

On the first 3-minute test the senior high school students in the control group typed significantly faster than the experimental group but not more accurately; there were no significant differences between groups on the second 3-minute test. On the first 5-minute test there were no significant differences between groups in speed, but the control group typed significantly more accurately. On the second and third 5-minute tests the senior high school experimental students typed significantly faster, but the control students typed significantly more accurately. On the final test the experimental group made significantly higher scores than the control group.

For the junior high school students there were generally no significant differences between experimental and control students in either speed or accuracy.

290. STOLLER, NATHAN, and GERALD S. LESSER. *The use of television for improving teacher training and for improving measures of student-teaching performance. Phase II. A comparison of methods of observation in pre-service teacher training.* USOE Grant No. 730035. New York: Hunter College of the City University of New York, 1963. (Mimeographed).

Problem: Determine the relative effectiveness of observing kinescope programs, television programs, and direct observation.

Sample: 288 Hunter College coeds.

Subject taught: Teacher education.

Key variables: Kinescope programs, television programs, direct observation; learning.

Students were divided into three groups in each of two consecutive semesters. Each group observed 11 lessons the first semester (10 in the second semester). One group made its observations via specially prepared kinescopes, a second via closed-circuit television, and the third via direct observation in elementary school classrooms. Students took a 120-item multiple-choice pre- and posttest on the informational aspects of the methods course around which the project was built and wrote an evaluation of a lesson as part of the final examination. Item difficulty and discrimination were determined for the former. K–R #20 *r*'s were .57 and .59 for the multiple-choice pretest given two semesters, and were .88 and .85 for the multiple-choice posttest. Inter-reliability *r*'s of scoring the essay tests ranged from .62 to .91. College grade averages were also available.

Analysis of variance on the objective "methodology" test scores for three observational treatments, two teachers, two scholastic ability groups over two semesters indicated significant F ratios for teachers, scholastic ability, semesters, and interaction between instructors and semesters (all .01 level), and significant interaction between observation treatments and semesters, and scholastic ability and semesters (.05 level).

On the other hand, analysis of variance on the essay Lesson Evaluation test scores for three observational treatments, two teachers, and two scholastic ability groups indicated significant F ratios for observational conditions, instructors, scholastic ability, and condition and instructor and ability interaction (all .01 level).

291. STREVELL, WALLACE H. *High school physics by television: the Houston area project.* USOE Project No. 306. Houston: University of Houston, September 1960.

Problem: Determine the relative effectiveness of ITV lessons on students of urban-rural backgrounds, segregated schools, and homogeneous grouping.

Sample: 422 students; 186 TV and 236 face-to-face. (160 were Negroes, 262 white; 152 in rural schools, 270 in urban schools; 192 in homogeneous classes; 230 in heterogeneous classes).

Subject taught: Physics.

Key variables: Learning and attitude; television and face-to-face presentation; racially mixed and unmixed classes; rural and urban students.

Students took the Iowa Physics Aptitude Examination and the Otis Gamma Quick-Scoring Mental Ability Test. At mid-term students took the Outterson Mid-term Physics Test and at the end of the year the Dunning Physics Achievement Test.

Analysis of variance and *t*-tests indicated no significant differences between ITV and face-to-face groups as determined by achievement scores. There were no significant differences between the achievement scores of ITV students in homogeneously grouped classes and ITV students in heterogeneously grouped classes. Negroes in ITV classes made significantly more gain (.01 level) than white ITV students of the same ability. In ITV classes, urban students tended to do better than their aptitude would predict. Rural students did not do as well as their aptitude would predict, although rural students tended to have slightly higher achievement scores than urban students. There were no significant differences between gains of rural ITV students and rural face-to-face students.

Students in schools having good conditions made significantly more gain (.05 level) in the control classes.

Student attitude (as determined from four five-point questions) was not related to amount of achievement gain.

Teachers were generally favorable to ITV.

292. STROMBERG, ELEROY L. "College credit for television home study." *American Psychologist* 7 (1952), 507–509.

Problem: Comparative effectiveness of TV at home teaching and face-to-face classroom teaching.

Sample: 66 students in TV section.

Subject taught: Introduction to psychology.

Key variables: TV teaching, face-to-face teaching, learning.

Sixty-six students were taught by open-circuit TV by viewing the program in their homes. In addition to viewing 39 televised lectures, students were required to submit written assignments and come to the campus for a final examination. During the presentation of the course, 66 percent of those enrolled dropped the course for various reasons. A standardized 110-question multiple-choice examination had been given to all students enrolled in the face-to-face sections of the course over the past few years. The median score for all previous face-to-face students was 54 with a range from 31 to 95.

Television-taught student scores ranged from 31 to 95 with a median score of 68. The age range of the TV students was 16 years to over 50 years and some had not been enrolled in classes for 30 years.

The author concludes that the open-circuit TV is an effective means of teaching college credit students in their homes.

Study includes a description of the administration of the course.

293. STUIT, DEWEY B., and others. *An experiment in teaching.* Iowa closed-circuit television teaching experiment; summary report. Iowa City: State University of Iowa, August 1956. (Mimeographed).

Problem: Determine the relative learning from lecture, lecture-discussion and small-group discussion methods, by face-to-face and ITV methods; and to determine students' attitudes toward ITV.

Sample: See below.

Subjects taught: Comparative foreign governments, American government, and Greeks and the Bible.

Key variables: Attitudes, learning from lecture, lecture-discussion, and discussion methods of teaching; face-to-face and ITV presentation.

The comparative foreign governments course had 87 students and all classes were by ITV. One section of the American government course had 68 ITV students and other lecture sections the following semester had 129 face-to-face students. The Greeks and the Bible course had 47 students who had half of the sessions by face-to-face methods and half by ITV.

Comparative foreign governments students filled in a questionnaire after 3 weeks of class and again after the course was finished. American government students filled in questionnaires after two-thirds of the semester, and 32 of the students were interviewed. Greeks and the Bible students filled in questionnaires the last week of school. Students in another face-to-face section of the same course also completed a questionnaire.

American government ITV students tended to rate that course as being much more interesting than the other courses they were taking, whereas face-to-face students rated that course as being somewhat more interesting. Students tended to feel that discussion added to the interest. The students in the foreign government course and Greeks and the Bible students who had been in other discussion classes before tended to rate their course about the same as their previous courses.

Foreign government students felt they learned more in lecture courses, but felt stimulated to greater thought in the ITV course. Greeks and the Bible students thought themselves equally stimulated and that they learned about the same from the face-to-face or ITV portions of the course. American government ITV students felt they were learning about the same over ITV as they would by face-to-face methods, and American government face-to-face students felt they would learn slightly less from ITV presentations.

American government ITV students tended to study more than face-to-face students, but Greeks and the Bible students studied equally for ITV and face-to-face presentations. Apparently discussion rather than television presentation was a greater influence in motivating students to study. Students felt participating was easier in a face-to-face class (despite a talkback system), and felt that the studio group had an advantage in participating in class discussion.

Analysis of variance on television, lecture, and discussion groups achievement scores indicated no significant differences among groups on either of two achievement tests.

294. SUCHY, ROBERT R., and PAUL C. BAUMANN. *The Milwaukee Experiment in Instructional Television: Evaluation Report.* Milwaukee, Wis.: Educational TV Project, Division of Curriculum and Instruction, Milwaukee Public Schools, 1960.

Problem: Comparative effectiveness of TV and face-to-face teaching.

Sample: 9,000 elementary, secondary, and vocational school students.

Subject taught: See below.

Key variables: TV teaching, face-to-face teaching, intelligence, teacher-opinion questionnaire.

This study combines the reports of three years of experimentation with instructional television in the Milwaukee Public Schools. The goals of the project when established in 1958 were (1) to compare the effectiveness of TV and face-to-face teaching for large groups, (2) improve effectiveness of TV as a teaching aid, (3) explore the possibility of effective integration of TV into the instructional program at all levels.

First year 1957–58.—Biology and history were taught at the high school level; general science and social studies at the junior high level; and science, health, and safety at the elementary school level to groups of about 200 in the junior and senior high schools and to groups of six regular classrooms in the elementary schools. A verbal type intelligence test was given to all students and each group was separated by random selection into either an experimental or a control group. The experimental group was taught by open-circuit TV while the control group was by face-to-face methods of instruction.

Based on scores of examinations given to both groups the authors found (1) both the experimental (TV) and the control (face-to-face) groups learned a great deal from the instruction; (2) there was no significant difference in learning for either group (achievement of high school American history appeared to be greater for the TV group than the face-to-face group, but authors felt this was due to uncontrolled variables in the experiment not related to method of instruction); (3) there was no differential effect on learning by method of instruction for differing levels of ability.

Second year 1958–59.—Subjects offered in this year were the same as the previous year except that social studies was dropped from the junior high school program. In the junior and senior high school, students met in large groups for TV instruction three days a week and twice a week for face-to-face discussion in groups of 30. In the elementary schools the six regular classrooms were combined for large-group TV instruction periods of 30 minutes.

An intelligence test was administered to both the experimental (TV) and control (face-to-face) groups. A standardized achievement and critical thinking test was administered to both groups as a pretest. A different form of this test was administered to both groups after the year's instruction as a posttest.

The authors concluded that (1) students in both groups exceeded national norms for the achievement test after instruction; (2) American history at the senior high school level was again significantly superior for the TV group as compared to the face-to-face group; (3) significant differences favoring the TV group were found for biology, elementary science, health and safety. There was no significant difference between TV and face-to-face taught general science groups; (4) there was no differential effect for ability between methods of instruction; and (5) there was no "appreciable difference" in ability to think critically between methods of instruction.

Third year 1959–60.—In continuing the experiment under the general design of the first two years, the authors found that (1) TV-taught students did as well as, or better than, students taught face-to-face; (2) the majority of the teachers in the system thought students learned as much or more because TV was used as a resource in the classroom; (3) a majority of the principals felt the curriculum was strengthened by the addition of TV to the classroom; (4) four of the 11 statistical comparisons were in favor of TV instruction. The other seven comparisons showed no significant difference between methods of instruction.

[Abstracts of these three reports are available in NAEB Research Fact Sheets.

First year, NAEB Research Fact Sheet, Series I, 61, *NAEB Journal* 18 (March 1959), 1–4.

Second Year, NAEB Research Fact Sheet, Series I, 79, *NAEB Journal* 18 (December 1959), 1–4.

Third Year and Final Report, NAEB Research Fact Sheet, Series I, 84, *NAEB Journal* 19 (July 1960), 1–2.]

295. SYKES, RONALD E. "The effectiveness of closed-circuit television observation and of direct observation of children's art classes for implementing elementary teachers' training in art education." *Dissertation Abstracts* 25 (1964), 2387.

Problem: Determine the relative effectiveness of face-to-face and TV observation methods.

Sample: 88 elementary education majors at Millersville State College.

Subject taught: Art in the elementary school I.

Key variables: Face-to-face and television observation; solving class situations.

Students were randomly assigned to three groups: 29 to a nonobservation group, 30 to a face-to-face observation group, and 29 to a television observation group. The latter two groups watched six 45-minute art lessons over a 6-week period. The TV observation students watched three monitors from three different cameras. The students filled in observation lesson information sheets and two note-taking forms before each observation in a 15-minute orientation period. After each observation session, the students had a 10-minute review conducted by the demonstration teacher. All students took an elementary art situational problems test (having 41 situations and 112 solutions, and a Spearman-Brown split-half r of .96) before and after the six lectures, and also a class test after the six lectures.

Analysis of covariance on the situational problems test indicated no significant differences between the scores of face-to-face and TV observation groups, but did indicate a significant difference (.001 level) between the scores of the two observation groups and the scores of the nonobservation students. Scores of the two observation groups on the class test were about the same.

296. TANNENBAUM, P. H. Instruction through television: A comparative study. Urbana: Institute of Communication Research, University of Illinois, June 1956. (Duplicated). In Hideya Kumata, *An Inventory of Instructional Television Research*. East Lansing: Educational Television and Radio Center, Dec. 1, 1956. (Offset).

Problem: Determine the relative effectiveness of ITV, film strip with audio, individual study, and kinescope presentations.

Sample: See below.

Subject taught: Periodontics.

Key variables: Weekly ITV, ITV audio only plus film strip, and study of the manual only presentations, and three kinescope presentations in one day; learning.

One group of practicing dentists saw a one-hour ITV lecture demonstration each week for three weeks and one discussion hour after the series was over. Another group ($N=10$) saw a film strip with the ITV audio. A third ($N=12$) studied only the manual which the other groups had. A fourth group ($N=40$) saw kinescopes of the series all in one day. A control group ($N=138$) had no instruction. Of the first group 160 took a 35-item multiple-choice test after the three viewings; 46 of the first group took the test after the discussion session. Eight items of the test were not covered either in the manual or the telecasts, and nine items were covered only in the ITV lessons.

The *t*-tests indicated that all the experimental groups except the manual only group had significantly higher scores than the control group. The kinescope group had significantly higher scores than the ITV groups. There were no significant differences among groups on the eight items not covered in either the manual or the ITV presentations.

297. TANNENBAUM, P. H. Instruction through television: An experimental study. Urbana: Institute of Communications Research, University of Illinois, 1956. (Duplicated). In Hideya Kumata, *An Inventory of Instructional Television Research.* East Lansing: Educational Television and Radio Center, Dec. 1, 1956. (Offset).

Problem: Determine the relative effectiveness of ITV and face-to-face instruction.

Sample: 167 ITV students and 189 originating room students.

Subject taught: Physiology.

Key variables: Learning and attitudes; ITV and face-to-face instruction.

ITV and originating room students were divided into two groups, matched on midsemester grades. Students saw three 50-minute lectures. A week later, students took an unannounced 19-item multiple-choice test.

Analysis of variance indicated that ITV students had higher mean scores (.07 level) than face-to-face students.

Students who were favorable and neutral toward ITV on a preference scale had significantly higher multiple-choice test scores than those who were unfavorable toward ITV. Students who were favorable tended to have higher scores than those who were neutral.

298. TENDAM, D. J. *Preparation and evaluation in use of a series of brief films of selected demonstrations from the introductory college physics course. Final report.* USOE Grant No. 7-12-027.11. [Lafayette]: Purdue Research Foundation, Aug. 31, 1961. (Offset).

Problem: Determine the relative effectiveness of film compared to face-to-face physics demonstrations.

Sample: 369 college students.

Key variables: Film and face-to-face demonstrations; immediate test and general course test scores, and seating location.

Students were randomly assigned to face-to-face or film demonstration treatments. The film group saw 20 demonstration films during the semester. Each group took a 5-minute test after each demonstration. A 40-item multiple-choice pretest served as a controlling variable for analysis of covariance. Students also took five course examinations.

Students viewing the films had significantly higher quiz scores (.01 level) than students seeing the face-to-face demonstrations. There were no significant differences between film and face-to-face groups on course examination scores, or on the course examination questions that dealt specifically with the demonstrations. There were no significant differences in scores of students who sat in the front half or rear half of the 280-seat room, and no significant interaction between viewing distance and treatment for any of the examinations. In a replication study the following spring there were no significant differences between film and face-to-face students' scores on the 5-minute examinations, and no significant differences or significant interactions otherwise.

Another group of students not involved in the experiment described above were invited to see the films of the demonstrations they had seen face to face. Only 11 percent and 16 percent of these students in the two semesters took advantage of this, and half of them saw only one film. The films were available 44 hours a week and were readily accessible to the students.

299. THOMPSON, FRANKLIN JAMES. "Use of closed-circuit television in teacher education: relationship to professional attitudes and interests." *Dissertation Abstracts* 21 (1960), 819.

Problem: Determine the relationships of student attitudes to direct classroom observation, observation by television, and observation by using selected films.

Sample: Education students at Minnesota.

Subject taught: Introduction to secondary education.

Key variables: Direct observation in the classroom, observation by closed-circuit television, instructional films; attitudes toward children, presentation method, and teachers.

Students were assigned to different primary viewing methods sections. Students took the Miller Analogies Test and the Minnesota Teacher Attitude Inventory. Analysis of variance run on these scores indicated no differences among sections. The television observations were of university high school speech and physics classes. The film observation section viewed selected instructional films. Direct observations were of classes in the university high school and other public high schools. For the first quarter of the course, each group watched five periods using its primary observation method and one period each by the other two observation methods. In the second quarter, students made only three observations; two using its primary observation method and one by an alternate method. Attitudes toward the course were measured by a course rating scale, and perceptions of directiveness in lectures and laboratory instruction and preferences for student-centered or subject-centered instruction were also obtained.

Analysis of variance and covariance run on appropriate scores revealed: (1) the observational method did not influence student attitudes toward children (MTAI scores), (2) students preferred direct observation to television and television to films, and (3) student attitudes were more related to differences in instructors than to various observational methods.

300. THROOP, JOSEPH F., LEWIS T. ASSINI, and GEORGE W. BOGUSLAVSKY. *The effectiveness of laboratory instruction in strength of materials by closed circuit television.* Troy, N. Y.: Rensselaer Polytechnic Institute, Nov. 8, 1958. (Offset).

Problem: Determine the relative effectiveness of ITV and face-to-face presentation.

Sample: 234 ITV students and 199 control group students.

Subject taught: 12 strength of materials lab experiments.

Key variables: Learning and attitude; ITV and face-to-face presentation.

The ITV students had a 15–20 minute face-to-face presentation in groups of 50 to 100, followed by the ITV presentation, followed by a face-to-face discussion and help with problems. A talk-back system was available. The 199 student control group was instructed in 12-student sections at the laboratory experiment site. Twelve quiz scores, scores on a 30-item multiple-choice final examination, term-paper grades, and course grades were available from all students. Students also answered an attitude questionnaire.

Critical ratios indicated no significant differences between groups on the quizzes, term-paper grades, final exam scores, or final grades. Chi-square analysis indicated the face-to-face technique was significantly more effective in developing students' familiarity with machinery. There were no significant differences between groups on the teaching of instrumentation or of theory.

Students took an 18-item, seven-response attitude questionnaire. The ITV students judged that the laboratory time was more efficiently used than the face-to-face students. The ITV group felt that the physical relationships of the various equipment aspects were not as clear as did the face-to-face students. The ITV group felt less confident than face-to-face students about retaining the material after 6 months. The ITV group felt somewhat more strain, and were more reluctant to ask questions than the face-to-face group. The face-to-face group strongly preferred face-to-face instruction, whereas the ITV group was about equally divided in their preference of presentation method.

301. TIEMANS, ROBERT K. *The comparative effectiveness of sound motion pictures and printed communications for the motivation of high school students in mathematics.* USOE Project No. 459. Iowa City: State University of Iowa, 1962. (Offset).

Problem: Compare the effectiveness of sound films and printed material to measure students' motivation.

Sample: 550 first-year algebra students in 17 Iowa schools.

Subject taught: Algebra.

Key variables: Film and printed material presentations; learning, attitudes.

Algebra classes were divided into three groups: one group saw three 15-minute specially produced films designed to motivate students by practical applications of algebra, one group read three printed booklets based on the films but having little visual material, and a control group which received no special communication. All students were given a motivation inventory, and the Lankton First-Year Algebra Test, and their motivation was rated by their teachers, before and after the treatment. The motivation inventory had four parts. One part was like, neutral, and dislike scales of algebra; another was a semantic differential instrument having students rate three concepts (algebra, English, and science) on 12 scales; the third part had students rate their interest on 29 mathematics topics; and the fourth part (posttest only) had students indicate if they planned to take additional math courses.

Analysis of covariance technique indicated that the film group had significantly higher scores than the booklet group on attitudes toward algebra, the activity factor of the semantic differential, and the Lankton test. The film group had significantly higher scores than the control group on these measures plus the evaluative factor of the semantic differential. The booklet group had significantly higher scores than the control group of the evaluative factor of the semantic differential. Teachers' ratings of work in algebra class correlated .93 with Lankton scores, but teachers' ratings of general behavior correlated low (around .20) with any of the criterion measures. Students' attitudes toward algebra and the potency, activity, and evaluative factors correlated between .48 and .64 with each other.

302. TINTERA, JAMES B. *Analysis of methods in which application of new communications media may improve teacher preparation in language, science, and mathematics.* USOE Project No. 008E. [n.p., n.d.]. (Mimeographed).

Problem: Determine the relative effectiveness of observation and conference, audio tape recordings and observation, and three kinescopes and observation.

Sample: 22 kindergarten and sixth-grade student teachers in East Lansing.

Subject taught: Teacher observation.

Key variables: Supervisor observation, supervisor observation and audio tape recordings, and supervisor observation and three kinescopes.

One-third of the sample was initially assigned to each one of the three treatment variables. Treatments were rotated through the course. Teachers took the Minnesota Teacher Attitude Inventory, the Ryan Observation scale, an attitude scale of teaching problems, a teacher self-description scale, and were rated by their supervisors. The ratings and the Ryan scale were made twice; the other instruments were taken three times: before, in the middle, and after the treatment. Audio tape recordings were given to the supervisor and teachers within a day after they were made. The kinescopes were available to the supervisor and the teacher usually in a week.

There were no significant differences between age, sex, grade point average, educational background, and amount of previous teaching experience of the students in the sample used in the study and a sample of other students who might have been available for the study. There were no significant differences among student teachers' scores on any of the instruments among any of the three presentation treatments. However, after 6 months of professional training, teachers who had had audio tape or kinescope recordings had significantly higher scores on the instruments used than teachers in the control group. It seemed that personnel officers tended to be more greatly impressed with teachers who had had audio tape or kinescope recordings. Beginning salaries of control group teachers averaged $4050 and beginning salaries of experimental group teachers averaged $4175.

303. TOFFEL, GEORGE M. *Effectiveness of instruction by television in teaching high school chemistry in Alabama schools.* USOE Project No. 302H. University: University of Alabama, August 1961. *Audio-Visual Communication Review* 10 (1962), A-81-82. (Abstract).

***Problem*:** Determine the effectiveness of ITV to supplement teaching high school chemistry in Alabama.

***Sample*:** 255 white and 79 Negro students in 10 white and five Negro schools.

***Subject taught*:** High school chemistry.

***Key variables*:** Television and face-to-face presentation; achievement, ability level, laboratory facilities, and teacher qualification.

All students took the Anderson Chemistry Achievement Test at various points in the year.

Largely because some white schools in the control group did not participate in the experiment, white students not using ITV made higher scores than those using ITV. Negro students using ITV made significantly higher scores than those not using ITV. White students having good teachers, good lab facilities, and having higher ability did better than students having poor teachers, poor lab facilities, and low ability. White men did better than white women. Negro students having good lab facilities, above-average mental ability, and above-average reading ability had significantly higher test scores than those students with poor lab facilities, below-average mental ability, and below-average reading ability. When both good teachers and good lab facilities were available, high-ability students made higher scores in face-to-face classes, and low-ability students made higher scores in ITV classes. When both ITV and face-to-face white students had good lab facilities but poorer teachers, face-to-face students tended to make higher scores. When both ITV and face-to-face Negro students had poor lab facilities but good teachers, the ITV students tended to make higher scores.

304. TORKELSON, G. M. "Teacher AV education via closed-circuit television." *Audio-Visual Communication Review* 6 (1958), 188-199.

***Problem*:** Determine teacher and student attitudes toward ITV.

***Sample*:** 130 students.

***Subject taught*:** Teacher education.

***Key variables*:** In-studio presentation with monitors for magnification, large lecture room TV viewing only, small room TV viewing only, and large lecture room with instructor present and monitors used only to show a kinescope.

The same students viewed all four presentation methods. After each class period, students filled out an attitude questionnaire. At first this was anonymous, but because of facetious comments, students' signatures were required. This change nearly eliminated the facetious comments, yet did not lessen the directness of criticism or praise.

Of the students 63 percent had taken a previous ITV course, and 62 percent indicated they would avoid enrolling in another ITV course. Sixty-eight percent felt the TV portions of the course were of some value; 62 percent preferred the small TV viewing rooms to the large lecture viewing room, but over 60 percent preferred instructor and appropriate projectors in one large room over use of television. Eighty-seven percent thought upper-level courses should not be taught on television. Eighty-one percent felt ITV required more "gimmicks" to maintain attention than did face-to-face lectures, and 63 percent replied that absence of color affected their receptiveness adversely.

305. TWYFORD, LORAN. Film profiles. *Instructional Film Research Reports.* Technical Report SDC 269-7-23. Port

Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1951.

Problem: Determine if subjective rating profile of instructional film could be considered a reliable measure of learning.

Sample: 276 students (106 high school, 170 college).

Subject taught: Precision measuring instruments.

Key variables: Profiles of subjective rating of film per unit of time, objective test of material contained in film, correlation between these measures.

This experiment sought to discover whether a subjective rating of a film would correlate high enough with an objective test of the film's content to be a valid indication of the learning from the film. A graphic representation of the film's subjective rating was made by having subjects depress a key on a console in front of them, while viewing the film, which corresponded to their rating of the film. The console was part of an electrical response recording machine called a *film analyzer.* Each time a key was depressed a mark was made corresponding to the key on a sheet of continuously moving graph paper.

The three kinds of rating profiles investigated were based on the following methods of responding:

1. I am learning from the film.
2. I predict that my classmates are learning from the film.
3. I like-dislike the film.

Procedure

Classes of high school juniors and seniors and college classes in beginning psychology and social psychology were randomly divided into seven groups. Each of the seven groups of a class followed a different one of seven procedures. Three of the procedures involved the continuous rating of an informational film. These three procedures yielded the three basic rating profiles:

1. A rating profile based on responses of *I am learning* (first showing).
2. A rating profile based on responses of *I predict learning* (first showing).
3. A rating profile based on responses of *I like-dislike* (first showing).

The same groups of students responded with the same judgments to a second showing of the same film, so that three "second-showing" rating profiles were produced:

1. *I am learning* (second showing).
2. *I predict learning* (second showing).
3. *I like-dislike* (second showing).

The other four procedures which included a control group which did not see the film, yielded three basic profiles representing learning from the successive intervals of the film as measured by objective tests:

1. Learning measured on Form A of a true-false test which contained items on all facts that might be learned from the film.
2. Learning measured by Form B of the test (true items in Form A were false items in Form B; false items in Form A were true items in Form B).
3. A combined test profile (based on the averaged scores from the two forms of the test mentioned above).

The *rating* profiles were compared with the objective test profiles to determine how closely high and low sections corresponded. Test profiles were also compared among themselves.

Results and conclusions

1. The three objective test profiles all yielded substantially the same measure of learning. (Intercorrelations between the test profiles were not significantly different from each other.)

2. The relatively high correlation between the *I am learning* profile and the combined test profile seems to offer some promise that students, with reasonable accuracy, can report when they are learning from a film. (*I am learning* correlated .53 with the combined test profile.)

3. Students do not appear to improve in this ability simply by making the same kind of judgments during a second showing of the same film. (*I am learning,* during a second showing of the same film correlated .52 with the combined test profile.)

4. *I predict learning* as a profile rating does

not appear to have much promise as a predictor of learning. (*I predict learning*, first showing, correlated .16 with the combined test profile.)

5. It does appear that students may need some practice in making this kind of rating and that they do improve somewhat during subsequent showings of the same film. (*I predict learning*, second showing, correlated .38 with the combined test profile.)

6. There is little relationship between a profile based on *like-dislike* and a profile of tested learning. (All correlations between *like-dislike* profiles and test profiles were small and negative.)

Implications

Profiles based on ratings of *I am learning* by samples of a target audience seem to have promise as a method of measuring the learning which results from various sections of a film.

It is possible that the ability of audiences to rate learning from an instructional film may be improved through training. In such training the instruction given prior to rating may have considerable importance.

306. ULRICH, JOHN HOLWAY. "An experimental study of the acquisition of information from three types of recorded television presentations." Unpublished Doctor's dissertation. State University of Iowa, Iowa City, 1955. *Speech Monographs,* 23 (1956), 123. (Abstract). (See also *Speech Monographs* 24 (1957), 39–45.)

Problem: Determine the relative effectiveness of viewing kinescopes of a lecture, a lecture with visual aids flashed on screen, lecture with instructor handling visual aids.

Sample: 40 eighth-grade classes from Chicago.

Subject taught: Food resources of Africa.

Key variables: Lecture, and lecture with filmed or direct visual aids, learning.

Pupils were divided into four groups: one group saw a kinescope of the straight lecture, one group a kinescope of the lecture with the instructor manipulating visual aids, the third group saw a kinescope of the lecture with the visual aids flashed on the screen, and the control group saw no lecture. Pupils were administered an immediate and delayed (30 days) content posttest.

Analysis of variance and t-tests on content scores indicated that all three groups remembered more on both administrations than the control group. On the delayed posttest, there were no differences in scores between the three experimental groups. On the immediate posttest, both groups having visual aids had higher scores than the lecture only group (.05 level).

307. VANDERMEER, A. W. Effects of film-viewing practice on learning from instructional films. Technical Report SDC 269-7-20. *Instructional Film Research Reports.* Port Washington, Long Island, N. Y.: U. S. Naval Special Devices Center, 1953.

Problem: Does prior experience in viewing instructional films help improve learning from additional films?

Sample: 182 ninth-grade high school students (99 female, 83 male).

Subject taught: General science.

Key variables: California Test of Mental Maturity, Calvert Science Information test.

Before this experiment, three groups of students in the Bellefonte [Pennsylvania] Public School eighth grade were taught general science by three instructional methods. One group had been taught face-to-face, another by seeing instructional films only, and the third by seeing the films and using a study guide.[1] This study is a continuation of experimentation with this group.

This experiment consisted of showing four additional science films, which none of the group had seen before, to these students. Two tests were given: (1) the CTMM for a measure of intelligence, and (2) the CSIT for a measure of science achievement. An additional measure of information gain was received from specially constructed tests of the content of the films. One film was shown to all groups on the same day and all four films were shown in four consecutive days. Each class saw the films in the same room especially equipped for film viewing. Students were unaware of the experiment and were instructed that the films were just a part of their regular classroom instruction and the grades on the tests would be part of their grade in the course.

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[1] For a report of this study see VanderMeer, A. W. Relative effectiveness of instruction by films exclusively, films plus study guides, and standard lecture methods. SDC 269-7-13. *Instructional Film Research Reports.* Port Washington, Long Island, New York: U. S. Naval Special Devices Center, 1950, pp. 7–27.

Data were analyzed by analysis of covariance adjusting for intelligence. Six of the 10 comparisons between the films and study guide taught group and the face-to-face taught group were significant. Four of the ten comparisons between the film exclusively taught and the face taught group were significant. All significant differences favored the film taught groups.

The author concluded that the "film viewing practice results in improvement of the ability to learn from other films of the same subject field."

308. VanderMeer, A. W. "Color vs. black-and-white in instructional films." *Audio-Visual Communication Review* 2 (1954), 121–134.

Problem: Determine the relative effectiveness in learning from color and black and white films, and students' attitudes toward color and black and white films.

Sample: 500 students and 240 students from Bellefonte, Pa., high school.

Subject taught: Ninth- and tenth-grade science.

Key variables: Five color and black and white films; verbal and nonverbal learning, retention, attitudes.

Two experiments were run. In the first, 500 students were divided into color film and black and white (prints made from the color originals) film groups. Each group had posttests immediately after each film, plus a sixth instrument (given 6 weeks later) over the whole series. (This had also been administered as a pretest.) The posttests included multiple-choice items as well as nonverbal items (identification of slides, etc.).

Two kinds of tests were used: nonverbal and verbal. Nonverbal tests were identification on maps, identification of sulphur types in glass vials, and slide pictures of snakes. Verbal tests were multiple choice. Test items were classified as to whether their source was in (1) the film's audio but not on the screen, (2) on the screen but not in the audio, (3) both audio and video. Each test, therefore, had a total score, three part scores related to color, and three part scores related to audio, being on the screen, or both.

A multiple-regression equation controlled for differences on scores on the CTMM.

On the immediate posttests, generally there were no differences in students' scores on the verbal instrument between the two groups, though means of the black and white group tended to be higher. On one film, the mean verbal score of the color groups was significantly higher (.05 level). For two of the three nonverbal immediate tests, the black and white group means were significantly higher (.01 level) than the color group means.

For the delayed posttests, three out of five comparisons of verbal test scores were significant (.01 level), all favoring the color group. There were no significant differences between delayed nonverbal posttest scores between color and black and white groups.

The second experiment, run with 240 students, was much like the first except that one group saw films A and B in black and white and saw C and D in color, and the other group saw films A and B in color and C and D in black and white. Testing was similar except that the delayed posttest was omitted. Test scores were transformed into standard scores. Some sex differences were found but overall there were no differences in learning between black and white and color films.

Students preferred color to black and white films, but there was little correlation between preferring color films and learning more from color films.

[See also *Instructional Film Research Reports*. Technical Report. SDC 269-7-28. Port Washington, N. Y.: U. S. Naval Special Devices Center, 1952.]

309. Van Horn, Charles, and Max Beberman. *A study to determine the relative effectiveness of the use of a series of filmed demonstrations in teacher education for a new high school mathematics cur-*

riculum. USOE Project No. 158. Urbana: University of Illinois [n.d.]. (Mimeographed).

Problem: Determine the relative effectiveness of filmed and direct observations in training teachers.

Sample: 68 high school mathematics teachers.

Subject taught: Mathematics (beginning algebra).

Key variables: Film and direct observations, learning, attitudes.

Twenty half-hour films were prepared from footage from shooting an algebra class. There were 68 teachers alternately assigned to either the film group or to the direct observation group. All teachers took five subject-matter competence tests. The teachers' pupils took three tests and 18 quizzes during the school year. Rank-ordering of the different mathematics topics was also obtained.

Test and quiz scores indicated that pupils of the film-trained teachers had a wider range of ability than pupils whose teachers had live observational training but there is no reason to believe that this difference is related to the teacher's training.

Analysis of variance and *t*-tests revealed no significant differences in scores on the five subject matter instruments between groups. No differences were found in achievement scores of pupils of the two groups.

Kendall's *W* and rank-order correlations indicated that film observation provides a more realistic basis for teachers' expectations than does live observations, but that teachers should be warned against imitating the teaching behavior they saw on film.

A Thurstone-type attitude scale to determine pupils' attitudes toward mathematics did not show any attitude shifts, either between groups or between administrations.

310. **VESTAL, DONALD ADAMS.** "The relative effectiveness in the teaching of high school physics of two photographic techniques utilized by the sound motion picture." *Abstracts of Doctoral Dissertations, The University of Nebraska,* Vol. 13. Lincoln: The University of Nebraska, 1952. p. 221–227.

Problem: Compare learning from animation films with learning from direct photography films.

Sample: Students in seven Nebraska high schools.

Subject taught: Electricity.

Key variables: Animated films and direct photography films, learning, and ability level.

Two instruments were developed. One (split-half $r = .88$) assessed the content of the animation film, and the other (split-half $r = .90$) the content of the direct photography film.

Students viewing each of the two film presentations got significantly higher scores on the posttest than the pretest. The mean gains between the animated and direct group did not differ significantly. Students who ranked in the upper quarter made gains on the direct photography instrument which were significantly greater than those on the animation test.

311. **VOORHIES, WILLIAM THOMPSON.** "An analysis of pupil and college student opinions concerning the use of closed-circuit television for observation of classroom instruction at Indiana University." *Dissertation Abstracts* 21 (1960), 558.

Problem: Determine the relative acceptance of college students and high school students of television as a tool for observation, and to determine attitudes toward certain procedures used in television observation.

Sample: 86 college students in mathematics, language and social studies methods classes at Indiana.

Subject taught: Teaching methods.

Key variable: Observation by television, attitude.

For one semester, observations of university high school classes were made by closed-circuit television, and attitude instruments were devised to assess reactions of students.

Eighty-six college students took three attitude questionnaires and a numerically scaled checklist, and were interviewed. Opinions of 175 high school students were determined by two attitude questionnaires.

Students felt that the simultaneous presentation of three television monitors each carrying a signal from a different camera were better than fewer. There was no agreement to who should "call the shots." Direct observation was judged by the students to be slightly better in some respects than television observation. High school students accepted their "guinea-pig" role well at first, but became less favorable to television over a period of time.

312. VUKE, GEORGE JOSEPH. "Effects of inserted questions in films on developing an understanding of controlled experimentation." *Dissertation Abstracts* 23 (1963), 2453.

Problem: Compare the effectiveness of learning from films wich and without inserted questions.

Sample: 81 seventh-grade science students.

Subject taught: Requirements of a good experiment.

Key variables: Inserting questions, learning.

Two films were prepared; one of 10 minutes having 18 questions and another of 8½ minutes with no questions.

A 45-item achievement instrument was constructed ($r=.84$), and was given as a pretest, posttest, and delayed (2 weeks) posttest.

Students were randomly assigned to two groups, each group viewing one of the films.

Mann-Whitney U tests and t-tests revealed no significant differences between the mean scores of either group for the posttest or for the delayed posttest. This was true even when the students' scores were analyzed by ability level. Scores between the pre- and posttest increased significantly for both groups, with higher-ability students making larger gains than lower-ability students.

313. WALTON, NORMA RUTH. "A pilot study of student attitudes in a closed-circuit television course by use of stimulated recall." *Dissertation Abstracts* 24 (1963), 1082.

Problem: Determine attitude, learning and participation differences between students taking a course by ITV and students in the originating lecture room.

Sample: 122 students.

Key variables: Face-to-face and television presentation, concentration, participation, attitudes, learning.

Students were randomly assigned to the in-studio (face-to-face) or ITV treatment groups. Measures of concentration on the subject matter were obtained by tape recording four lectures, playing back portions and asking the students to indicate what happened next. Participation measures were obtained from instructors' ratings of students on a three-point scale. An attitude toward the course scale was also administered.

There were no differences between the groups on scores of any of the above measures, or on achievement in the course.

314. WASHINGTON COUNTY [Maryland] BOARD OF EDUCATION. "Closed Circuit Television: Teaching in Washington County 1958–59, a Progress Report." NAEB Research Fact Sheet, Series I, 81, *NAEB Journal* 19 (1960), 1–4. (Abstract).

Problem: Effectiveness of TV teaching.

Sample: 16,500 students in elementary and secondary school.

Subject taught: Not given.

Key variables: Student reactions to TV instruction.

Report of tentative findings from third year of a 5-year project to teach each student in the system at least one hour a day by closed-circuit TV. A 50-item questionnaire distributed to 32 percent of students produced the following results: (1) students accepted TV as means of instruction, (2) lack of communication with TV teacher was not a problem, (3) 87 percent of respondents said a followup discussion after telecast was helpful, (4) 58 percent thought they learned more from TV instruction than from face-to-face instruction, but 68 percent said they had to pay closer attention in TV classroom, (5) students reported that they spent more time studying, reading in library, and participating when taught by TV than when taught by face-to-face methods.

A questionnaire given to families of students and community leaders showed that a high percentage of families and leaders approved of TV instruction. Eighty percent of classroom teachers favored the present system of TV instruction and wanted it continued.

315. WATERS, GRACE J., and FRANCES HARDY. *The Norfolk City Experiment in Instructional Television: The Big Picture, September 1957 to June 1960.* Norfolk, Va.: Educational Television Project, Norfolk City Public Schools [1960].

See Summary No. 148.

316. WEDBERG, DESMOND P. *A comparative investigation of the instructional and administrative efficiency of various observational techniques in the introductory course in education.* USOE Project No. 685. Los Angeles: University of Southern California, 1963. (Offset).

Problem: Determine the relative effectiveness of observation methods.

Sample: 151 students.

Subject taught: Observation.

Key variables: Direct observation for 30 hours; direct observation for ten hours after 10 hours of programed observation of sound films, sound filmstrips, slides and tape, and tape recordings; ten hours of programed observation of sound films, sound filmstrips, slides and tape, and tape recordings; learning.

Students took a 60-item multiple-choice content pretest (Kuder-Richardson (K–R) $r = .53$). Also available were School and College Ability Test scores, Professional Aptitude Test scores, teaching aptitude scores, and environmental pretest scores. Students also completed a classroom observation report, and experimental students filled in an observation program evaluation checklist. Students were randomly assigned to one of the three treatment groups.

The t-tests indicated that scores on the content posttest of students in both the experimental treatments were significantly (.01 level) greater than scores of students in the control group, but were not significantly different from each other.

317. WEISGERBER, ROBERT ARTHUR. "The effect of science motivational films on the attitudes of secondary school pupils toward the field of science." *Dissertation Abstracts* 21 (1960), 505–506.

Problem: Determine the effect of science motivational films on interests.

Sample: Eighth- and tenth-grade students from two schools.

Subject taught: Science.

Key variables: Subject matter and motivational films, attitudes, and attitudes over time.

Students took the Kuder Preference Record (Vocational), a course preference scale, a science attitude scale, and a business attitude scale as pre- and posttests. Many students were also interviewed.

Statistics used were the Mann-Whitney U test and chi square.

It was concluded that eighth-grade students in a school offering a required, academic or non-academic science course did not significantly change their attitudes about science classes, about seeing science films, about scientists' work, or about science teachers after seeing the science motivational films. Motivational films exerted a significant influence on students' preference for taking later science courses. The purposes of the films were recalled a month later.

On the other hand, tenth-grade students in a school offering optional continuing science courses had significantly higher attitudes about science classes after the motivational films. Their attitudes about science films, scientists' work, or science teachers did not change after viewing the motivational films. Interest in science activities as measured by the KPR(V) increased significantly after viewing the motivational film.

318. WELLS, DAVID WAYNE. "The relative effectiveness of teaching first year algebra by television-correspondence study and teaching first year algebra by conven-

tional methods." *Dissertation Abstracts* 20 (1960), 3137.

Problem: Determine the relative effectiveness of teaching algebra by television-correspondence and by face-to-face methods.

Sample: 110 television-correspondence and 88 control students in Nebraska high schools.

Subject taught: First-year algebra.

Key variables: Television-correspondence and face-to-face presentation; learning and ability level.

Correspondence materials included course organization, reading and study assignments, and instructions for completing assigned work. The television portion consisted of daily 30-minute television lessons. Local proctors in each high school administered tests and answered some questions.

All students took the Cooperative Mathematics Test for Grades 7, 8, and 9, the California Algebra Aptitude Test, and the Henmon-Nelson Test. The Cooperative Algebra Test was administered as a final exam.

Students in the television-correspondence group did as well as students in the control group. Experimental students whose local proctors were not certified teachers of mathematics did as well as experimental students whose local proctors were certified to teach mathematics. Both high- and low-ability students in the control group did as well as high- and low-ability students in the experimental group.

319. WESTLEY, BRUCE H., and LIONEL C. BARROW, JR. "Intelligence and the effectiveness of radio and television." *Audio-Visual Communication Review* 7 (1959), 193–208.

Problem: Determine the relative effectiveness of ITV and radio on learning.

Sample: 228 sixth-graders in four Madison, Wisconsin, schools.

Subjects taught: Current events: the presidency, congressional issues, the Fuchs expedition, and the Caribbean and Venezuela.

Key variables: Learning, retention, and ability level; radio and TV presentation.

All students took the California Test of Mental Maturity (CTMM) and were assigned on a stratified random basis to experimental and control groups. The programs were 15 minutes long; the radio and TV versions were broadcast simultaneously. Students' CTMM scores determined whether they were classified into low (<107), medium (107-116), or high (>116) ability levels. A 24-item multiple-choice achievement test was administered immediately after each program, and a 32-item (eight items from each of the four previous tests) retention test was administered six to ten weeks later.

Analysis of variance indicated that ITV students learned significantly more factual information than radio students, but on a 6-weeks retention test, there were no significant differences between groups. The average-ability group did not learn significantly more from ITV. Verbal intelligence made a larger contribution than nonverbal intelligence to factual learning.

320. WESTLEY, BRUCE H., and LIONEL C. BARROW, JR. *Exploring the news: a comparative study of the teaching effectiveness of radio and television.* Research Bulletin No. 12. Madison: University of Wisconsin Television Laboratory, May 1959. (Mimeographed). (See also *Audio-Visual Communication Review* 7 (1959), 14–23.)

Problem: Determine the relative effectiveness of radio and ITV presentation.

Sample: 228 sixth-grade pupils in eight classes of four Madison public schools.

Subject taught: News programs.

Key variables: Learning and retention; television and radio presentation, discussion after programs, and topic.

Pupils in each of the eight classrooms were randomly assigned to radio or television treatments after stratification by the CTMM scores. All pupils heard all four 15-minute programs.

Analysis of variance run on 24-item immediate recall tests indicated that scores of ITV pupils were significantly higher (.01 level) than scores of radio pupils. Pupils with higher IQ scores obtained significantly higher recall scores than pupils of lower ability. There were no significant differences in recall scores of groups which had a follow-up discussion after the programs and those which did not. There were no significant differences in scores of television and face-to-face pupils on a 6-week 132-item retention test, administered 6 to 10 weeks later, although program and intelligence differences were still present. The number of words used to describe a theme and the method of presentation were both significantly related to the frequency of first mentions in response to an open-ended question.

When pupils were divided by high-, medium-, and low-intelligence scores, analysis of variance showed a significant relation between intelligence scores and immediate recall scores, and a significant relation between method of presentation and immediate recall scores, but no significant interaction between method of presentation and intelligence. Analysis of variance showed no significant differences between radio high-, medium-, and low-ability groups and ITV high-, medium-, and low-ability groups on delayed recall scores.

Teachers' preferences for radio or ITV were equally divided.

321. WESTLEY, BRUCE H., and HARVEY K. JACOBSON. *Modern math on TV: Its impact on pupils and teachers.* Research Bulletin No. 15. Madison, Wis.: University of Wisconsin Television Laboratory, December 15, 1963. (Mimeographed). (See also *Audio-Visual Communication Review* 10 (1962), 179–185, 328–333, and 11 (1963), 47–60.)

Problems: Determine pupils' and teachers' attitudes toward ITV, and determine pupils' attitudes toward teacher and courses.

Samples: 33 participating and 17 nonparticipating teachers (86.2 percent return of a mailed questionnaire) of fourth- and ninth-grade mathematics in Madison public schools; 234 fourth- and ninth-grade pupils.

Subject taught: Mathematics.

Key variables: Grade level, participation in ITV; attitudes.

Fifty teachers were sent a 55-item Likert-type test of attitudes toward ITV. A factor analysis of their responses indicated ten factors: challenge-threat, economy, instructional side-benefits, partnership, responsiveness, parental influences, security, invidious comparison, experimental attitude, and in-service training.

The teachers generally felt favorable toward ITV (as in the instructional side-benefits factor), and also felt secure and irreplaceable (as witnessed by the security factor and a rejection of the idea of threat and invidious comparison).

Analysis of variance run on mean-item scores between participating and nonparticipating groups resulted in 16 (of a possible 55) F ratios that were significant at the .05 level or greater. In all 16 the participating teachers were more favorable than the nonparticipants.

Analysis of variance run on mean-item scores indicated that participants were significantly more favorable toward ITV than nonparticipating teachers, (.01 level), and that teachers of the fourth grade were significantly more favorable than teachers in the ninth grade (.05 level). (Not only were the two courses at different levels, they were taught by different TV teachers.) There were no significant differences in attitude scores between teachers having a bachelor's degree or less and teachers having a master's degree, and there were no significant differences in attitude scores among teachers who had been teaching for 1–4 years, 5–15 years, or 16–40 years.

Fourth-grade teachers tended to be more favorable toward ITV, regardless of whether or not they were participants.

Pupils were told that next year they could take mathematics either by ITV or face-to-face methods, and were told to indicate their preference, and why. Thirty-eight percent chose ITV, 61 percent chose face-to-face instruction, and 1 percent was undecided. The authors found that less than 40 percent of the reasons why were favorable to ITV. The largest number of reasons concerned the course content, and the next largest number concerned the medium of instruction. The reasons given for favoring ITV dealt with course materials and assignments, and the reasons given for favoring face-to-face instruction dealt with the length of the ITV courses and the lack of discussion in ITV courses.

Pupils of one teacher were significantly more favorable toward ITV (.01 and .001 levels) than the pupils of two other teachers.

322. **Westley, Bruce H., and Harvey K. Jacobson.** "Instructional television and student attitudes toward teacher, course, and medium." *Audio-Visual Communication Review* 11 (1963), 47–60.

Problem: Determine pupils' attitudes toward the course, teacher, and related concepts.

Sample: 503 ninth-grade pupils in Madison, Wisconsin schools in 1961.

Subject taught: Algebra.

Key variables: Attitudes toward ITV and the TV teacher; ITV and face-to-face presentation.

There were 234 students that saw a year-long course "Patterns in Mathematics"; 269 were taught algebra by face-to-face lectures. Pupils took a semantic differential instrument with 12 concepts (the ITV group's instrument had 14 concepts), having 17 adjective scales.

ITV pupils had more favorable attitudes than face-to-face pupils, when scales for each of the three dimensions (evaluative, potency, and activity) were combined (.0001, .0001, and .02 levels by sign tests).

Generally, the ITV group had more favorable attitudes toward course content concepts (such as Proof and Linear Programing) and toward their own classroom teachers, than the face-to-face group. The ITV group also rated their own teachers more favorably than they did the TV teacher. The ITV group rated their textbook less favorably than did the face-to-face group. ITV pupils rated the concept Mathematics on Television more favorably than did face-to-face pupils.

323. **Westley, Bruce H., and Joseph B. Mobius.** *The effects of "eye-contact" in televised instruction.* Research Bulletin No. 14. Madison: University of Wisconsin Television Laboratory, Dec. 15, 1960. (Mimeographed).

Problem: Determine the effects of eye-contact on students' attitudes.

Sample: 51 women's dormitory residents.

Subject taught: Computer applications.

Key variables: High, medium, and low eye-contact; attitudes.

Paid female students were randomly assigned to one of three groups. Each group received all of the three treatments, on three consecutive nights. The high, medium, and low eye-contact treatments were defined by having the speaker look at the take lens 90 percent, 40–60 percent, and 10 percent of the time.

All three speeches were videotaped. Pictures were secretly taken of each viewing group at one-minute intervals. The average of all those observations provided a group attention score. Immediately after the picture was taken, a bell rang and students indicated their interest at that point on a seven-point scale. Students filled out a semantic differential form after three of the speeches, and also took a multiple-choice information test over the program's content.

Analysis of variance showed no significant differences attributable to eye-contact variations in attention, learning, or interest; they did show differences among groups despite randomization procedures.

324. **Westover, Frederick L. and others.** *Report evaluating the results of teaching Accounting I by means of closed-circuit television presentation.* University: University of Alabama, Sept. 6, 1958. (Mimeographed).

Problem: Determine the relative effectiveness of face-to-face and ITV presentation.

Sample: About 275 students at the University of Alabama.

Subject taught: Accounting I.

Key variables: Learning and attitudes; face-to-face and ITV presentation.

Students were divided into three groups: (1) a group of five sections receiving accounting by ITV, (2) a group of one section, taught by the same teacher, receiving accounting by face-to-face presentation, (3) a group of six sections taught face-to-face by different instructors. The ITV sections had 2 ITV hour-long presentations each week, and one face-to-face two-hour laboratory session each week. All students took six 30-minute tests, a 2-hour mid-term and a 2½ hour final examination. About half the course grade was based on objective questions and half on problems. The objective tests used were prepared by the author of the textbook. The *t*-tests between experimental and control groups on freshman placement algebra, reading, SCAT quantitative, verbal and total scores indicated no significant differences between groups on any of the measures.

Analysis of variance conducted between experimental and control groups on final examination scores and on average course scores indicated no significant differences between groups. Chi square indicated no significant differences between groups in the number of dropouts during the course. ITV and face-to-face students tended to make about the same grades and to do as well (or as poorly) on the following course, Accounting II.

Face-to-face students tended to rank Accounting I as more preferable than did ITV students. Students indicated they would prefer for Accounting II to be a face-to-face presentation. Face-to-face students thought the instructor's lectures were more effective than ITV students did, but all students thought that the laboratory sessions were sufficiently helpful in answering questions.

325. WETTER, ALLEN H., and MARTHA GABLE. "Report of the National Experiment of Television Teaching in Large Classes, 1957–58." Philadelphia Public Schools. 1958. NAEB Research Fact Sheet, Series I, 49, *NAEB Journal* 18 (November 1958), 1–4. (Abstract).

Problem: Comparative effectiveness of television and face-to-face teaching.

Sample: 250,000 students.

Subjects taught: Social, biological, and physical science.

Key variables: TV teaching, face-to-face teaching, learning.

As part of the Ford Foundation and the Fund for Advancement of Education project, students in two elementary, four junior high, and three senior high schools received part of the weekly instruction by open-circuit television. Student achievement was compared on the basis of standardized tests administered to the students taught by TV and similar groups of students taught the same subjects by face-to-face methods.

Results.—The authors reported that (1) a majority of the students learned as much, or more, than if they had been taught face-to-face, (2) more study is needed to determine what is actually learned by televised instruction because teachers reported that they felt intangibles were being taught by TV that were not measured on tests.

Study also includes description of the administrative structure of the project and the problems encountered during the first year's operation.

326. WETTER, ALLEN H., and MARTHA GABLE. "Report of the National Experiment of Television Teaching in Large Classes, 1958–59." Philadelphia Public Schools, 1959. NAEB Research Fact Sheet, Series I, 77, *NAEB Journal* 18 (November 1959), 1–2. (Abstract).

Problem: Comparative effectiveness of television and face-to-face teaching.

Sample: 15 schools (8 continued from previous year).

Subjects taught: Social studies, biology, mathematics, language arts.

Key variables: TV teaching, face-to-face teaching, learning.

This is a continuation of the National Experiment in TV Teaching for Large Classes. Subjects were taught by TV and face-to-face methods. Comparisons were made on standardized tests given to both groups.

Results.—(1) Standardized tests indicated that TV students did significantly better in Grade 5 science than face-to-face taught students; in the language arts, face-to-face students were slightly better. (2) Junior high school students taught by TV were significantly higher in mathematics than face-to-face taught students. (3) Senior high school students taught by TV did slightly better than face-to-face taught students in biology. (4) 105 high school students would choose to take biology again by TV, 18 would choose face-to-face, and 10 would not care according to an opinion questionnaire. (5) High school students in consumer mathematics did slightly better when taught by TV than when taught face-to-face.

Study also contains a descriptive report of the administration of the second year of the project.

327. **Wickline, Lee E.** *The use of motivational films to favorably change the attitudes of high school students toward science and scientists.* USOE Project No. 729. [Charleston]: West Virginia Department of Education, July 1962. (Offset).

Problem: Determine students' attitude change as a result of seeing motivational films.

Sample: Students in the tenth, eleventh, and twelfth grades.

Subject taught: Science.

Key variables: Attitude, information about scientists or science.

Experimental students at each level were those enrolled in biology, chemistry, or physics respectively. Control students in each level were non-film biology students, non-film chemistry and American history students, and nonfilm physics and sociology students at the tenth, eleventh, and twelfth grades respectively. All students took the Allen Attitude Scale and the Facts About Science test as pre- and posttests. Experimental students received 10 Horizons of Science films, one each week.

Analysis of variance rejected the idea that the control and experimental groups were from the same population on Facts About Science pretest scores (.01 level).

Attitudes of experimental students as measured by the Facts About Science instrument showed a nonsignificant positive change from pre- to posttest. Attitudes of control students as measured by the Facts About Science test changed significantly (.01 level) to a more negative position from pre- to posttest. Generally there were no significant differences between pre- and posttest scores for males or females, except for control group males, who changed significantly more negatively. There were no significant differences between pre- and posttest scores for students planning to take additional courses, except for students in the control group who changed significantly more negatively.

There were no significant differences between pre- and posttest scores for either the experimental or control groups on the Allen test.

328. **Williams, D. C., J. Paul, and J. C. Ogilvie.** "Mass media, learning and retention." *Canadian Journal of Psychology* 11 (1957), 157–163.[1]

Problem: Comparative effectiveness of TV, radio, print, and face-to-face teaching.

Sample: 108 second-year undergraduates at the University of Toronto.

Subject taught: Anthropology.

Key variables: TV teaching, radio teaching, print teaching, face-to-face teaching, learning, retention.

Students were randomly divided into four groups in a stratified sample so that each group had an equal number of students with high, low, and average accumulative school grades. Each of the four groups was assigned to one medium of instruction: TV, radio, reading, or face-to-face. The examination to be given after instruction was counted as part of their grade in the course to insure uniform motivation.

A lecture was delivered in the TV studio in the presence of the face-to-face group. The radio group heard the audio portion of the lecture and the TV group heard and saw a telecast of the lecture. Mimeographed copies of the lecture were given to the reading group to read and study during the time the other groups were receiving the lecture. No note-taking was allowed in any group.

Immediately after instruction an examination of 19 multiple-choice questions and one essay question was given to all groups. Eight months later the same examination was given to all groups as a measure of long-term retention. (A confounding event may have occurred in that the kinescope recording of the lecture was shown over one of the local TV stations before the delayed posttest, but the authors assume this effect was randomly spread over all methods of instruction groups.)

Results.—Analysis of variance technique showed significant differences between the groups. Achievement also was found to be significant. A *t*-test was performed between the means of the groups on the immediate posttest. The data are tabulated below:

Group	*Number*	*Mean*	*p*
TV	27	14.7	.01
Radio	27	13.2	.05
Reading	27	12.4	NSD
Face-to-face	27	12.3	

On the delayed retest 8 months later, each group scored significantly lower and there were still significant differences between groups. The most noticeable change was the movement of the face-to-face group up from last place to second place. The medium used made significant differences in the amount of material retained since TV, radio, and reading ranked in the same order on both tests.

Conclusions.—Media do influence retention in terms of immediate and delayed retention tests. The superiority of the TV group over radio and reading reconfirm previous experiments showing that two sense modality presentations are more effective than one sense modality presentations. The studio conditions during the televising of the lecture presented such environmental distractions that the authors chose to withdraw any conclusions from the performance of that group.

329. WILLIAMS, RICHARD HENRY. "An analysis of the importance of format to educational television programs." *Dissertation Abstracts* 16 (1956), 2082.

Problem: Determine which of four suggested formats was most effective in presenting information and maintaining audience interest.

Sample: Four groups of parents and teachers.

Subject taught: Utilization of 16 mm film clips.

Key variables: Interest, information; expert, expert plus teacher, expert plus parents, and expert plus children presentations.

Two experts each made four 15-minute kinescopes discussing 16 mm film utilization, using four different formats: (1) expert alone, (2) experts and fifth- and sixth-grade children, (3) expert and two parents, and (4) expert and a teacher and a school administrator. Each set of four programs was shown to four groups of parents and four groups of teachers.

Interest was measured by a forced-rank instrument and an audience response device; information was measured by a forced-rank instrument and two content points. On the forced-rank interest instrument, the results were: (2), (3), (4), (1) preferred from high to low order. On the forced-rank information instrument the results were (4), (2), (1), and (3). The audience response meter reading showed no significant differences. The author based his conclusion of finding significant differences on the ranking technique.

330. WITTICH, WALTER A. *Off-camera: A pictorial glimpse of AV–TV: An investigation and evaluation of more efficient ways of training teachers to improve their day-to-day classroom learning activities and procedures through the uses of audio-visual media.* USOE Project No. 015. Madison, Wisc.: The University of Wisconsin, June 1961. (Mimeographed).

Problem: Determine the effectiveness of ITV lessons designed to improve teachers' use of and attitudes toward AV materials.

Sample: 625 teachers.

Subject taught: Using AV materials.

Key variables: Teachers' attitudes and performance.

Forty-two half-hour kinescopes of AV materials were shown three times a week to six areas in Florida and the Midwest. Four scales determined the effect of the ITV course on daily practices of the teachers, changes in attitudes toward AV materials, teachers' opinions of the course, and whether the course was reaching the teacher it was designed for.

The Dixon-Mood sign test and *t*-tests revealed the course had a small but significant positive effect on using AV materials in the classroom, that teachers were favorable toward the course, and that posttest attitude scores toward AV materials were higher than pretest scores.

331. WITTY, PAUL, and JAMES P. FITZWATER. "An experiment with films, film-readers and the magnetic sound track

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[1] See earlier reports of this study: Paul, J. and J. Ogilvie. "Mass media and retention." *Explorations* 4 (1955), 120–123. Williams, D. C. "Experiment in communication." *Explorations* 3 (1954), 75–82.

projector." *Elementary English* 30 (1953), 232–241.

Problem: Effect of film viewing on improving reading skills.

Sample: 159 grade students.

Subject taught: Reading improvement.

Key variables: Learning from conventional reading instruction, learning from film reading instruction, student and teacher opinions.

The study was conducted for the second semester of the 1951–52 school year. For the first half of the semester students were taught reading improvement in the conventional manner with basal readers and supplementary materials. During the second half of the semester students were taught reading by seeing four films and then reading the accompanying film reader.

All pupils were given standardized tests of reading at the beginning of the semester and the change in instruction point (mid-semester) and at the end of the semester. The films were especially designed for teaching reading improvement and the magnetic sound track projector was used to record student language development.

All students were given the California Reading Test in differing forms as the criterion measure. Students were matched on Kuhlmann-Anderson Test of Mental Ability and the Northwestern University Interest Inventory.

Results.—(1) The CRT was determined too easy for grade 2 students and therefore interpolation of results was necessary. Authors state that significant gains in ability were made for both types of instruction, but gains during the experimental period were greater than gains during the control period. (2) Teacher reactions to the experimental method were strongly in favor of film method of teaching reading. (3) Student reaction was strongly in favor of the film method.

332. WOLGAMUTH, DALE. *A comparative study of three techniques of student feedback in television teaching: the effectiveness of an electrical signal feedback system.* USOE Grant No. 749096. Wasnington, D. C.: The American University, Dec. 11, 1961. (Offset).

Problem: Determine the relative effectiveness of microphone talkback, vicarious feedback, and electrical signal feedback.

Sample: 80 undergraduate students at the American University.

Subject taught: Group dynamics.

Key variables: Feedback method, learning, retention, and attitudes toward ITV.

Students were randomly assigned to one of the three feedback conditions or a control group. The electrical signal feedback condition provided each student with a box having four buttons to indicate various responses. Under this condition the teacher was made aware of student response only if one-fifth of all the buttons were pushed. The vicarious group was theoretically represented by a studio class. The control group had no feedback. All groups saw five 30-minute lectures. Each group saw a different series of lectures.

Students took three pretests: the California Test of Mental Maturity, an adult scale, and a subject matter inventory. Following the last ITV lecture, students took another subject matter inventory and an attitude questionnaire.

There were significant differences (.05 level) among CTMM means among groups, but no significant differences among pretest subject matter scores. Analysis of covariance indicated a significant difference (.05 level) among groups on posttest subject matter scores when adjusted for IQ scores. Analysis of covariance indicated no significant differences among groups on posttest subject matter scores when adjusted for pretest subject matter scores, and no significant differences when adjusted for both pretest and IQ scores. Analysis of variance indicated no significant differences among groups on retention scores.

Analysis of variance on students' attitude of teacher effectiveness or televised teaching indicated no significant differences among groups, but indicated significant differences (.05 level) among groups on teacher's personal attractiveness and value of a feedback system. *S*s in the control and electrical signal feedback group seemed to have the most favorable attitudes. The electrical signal students had the most favorable attitudes toward the value of a feedback system. In attractiveness of televised teaching, the largest difference was between the control and electrical signal feedback students.

4

333. ZUCKERMAN, JOHN V. "Predicting film learning by pre-release testing." *Audio-Visual Communication Review* 2 (1954), 49–56.

Problem: Determine the effectiveness of predicting learning from a film with a filmstrip based on the film.

Sample: Student pilots at Williams AFB.

Subject taught: Jet airplane F86 A.

Key variables: Film and filmstrip presentation, learning.

Trainees were randomly assigned to film and filmstrip treatments. The film group saw a color film; the filmstrip group saw a 262-frame black-and-white filmstrip along with a recording of the film's sound track. Both groups took a 26-item multiple-choice instrument based on key points in the film and filmstrip.

Pearson *r*'s were computed on posttest scores of the two groups (.80), absolute gains (.71), adjusted absolute gain scores (.94) and adjusted relative gain scores (.89). It was concluded that the filmstrip could be used to predict learning from this type of film.

Author Index

[Numbers refer to Research Summary Number]

A

Abbey, June C., 1
Abel, Frederick Paul, 2
Aird, E. L., 273
Albert, Fritz A., 209
Alexander, Forrest Doyle, 4
Alexander, Virgil William, 5
Allen, M. R., 6
Allison, Sarah G., 7
Almstead, Francis E., 8, 271
Ambrosino, Michael J., 9
Amirian, Gerard Thomas, 10, 63, 169
Anderson, George R., 11
Anderson, Kenneth E., 12
Andrade, Manuel, 122
Andrews, John J., 13
Aronson, A. E., 138
Ash, Philip, 7, 14, 15, 16
Asher, James J., 17
Assini, Lewis T., 300

B

Bailey, Herbert Sternbergh, 18
Barcus, Delbert, 122
Baron, Morton L., 197
Barrow, Lionel C., Jr., 19, 319, 320
Baumann, Paul C., 294
Beatts, Patrick M., 20
Beatty, Walcott H., 65
Beberman, Max, 309
Becker, Samuel L., 21, 22, 23, 24
Benner, Charles P., 25
Benschoter, Reba Patterson, 26, 135
Berger, Emil Joseph, 27
Beymer, C. Lawrence, 115
Blain, Beryl Bruce, 28
Blancheri, Raymond L., 29
Bobren, Howard M., 30
Boguslavsky, George W., 129, 300
Bollenbacher, Joan K., 54, 55, 141, 142, 143
Bookout, Jonathan C., 51
Boone, W. F., 31
Boyd, Claude C., 59
Brandon, James Roger, 32
Brown, James I., 33
Bryan, Edward F., 34
Buckler, William E., 35
Buenger, Louise R., 117
Bundy, E. Wayne, 36
Burger, Elizabeth, 37

C

Capraro, Thomas C., 38
Carlton, B. J., 14
Carner, Richard Leland, 39
Carpenter, C. R., 40, 41, 42, 103, 247, 282
Carter, Lamore J., 43
Caspers, Wesley, 44
Castle, C. Hilmon, 45
Chabe, Alexander M., 46
Champa, V. Anthony, 47
Charles, Don C., 26, 135
Chausow, Hymen M., 77
Clevenger, Theodore, Jr., 48, 49
Clifton, Marguerite A., 278
Cobin, Martin T., 48, 49, 50
Coleman, Wade H., Jr., 51
Colville, William K., 81
Cook, John Oliver, 162
Craig, Gordon Q., 53
Curry, Robert P., 54, 55, 56

D

Davies, Vernon, 57
Davison, Hugh M., 234
DeMarco, Norman, 139
De Prospo, Nicholas D., 58
Desiderato, O., 154
Desrosiers, Wilfred, 136
Devault, M. Vere, 59

DeViney, Robert Dawson, 60
Devitt, Joseph J., 61
Diamond, Robert Mach, 62
Dietmeier, Homer Justin, 63, 90, 169
Dowell, Ernest C., 64
Downing, Ullainee M., 55
Dreher, Robert E., 65
Driscoll, John P., 66, 67, 68
Duke, Ben Calvin, Jr., 69
Dunhan, Morton D., 70
Dunlap, Rhodes, 23
Dunstan, William H., 9
Dutton, Eugene, 51
Duva, James S., 249, 250
Duval, D. P., 71
Dyer-Bennet, John, 72

E

Ellery, John B., 73
Enders, Donald Earl, 74
Engar, Keith M., 97, 98
Engbretson, William E., 115
Engelhart, Max D., 75, 189
Erickson, Carlton W. H., 76
Erickson, Clifford G., 77
Evans, Lewis D., 85
Evans, Richard I., 17, 78, 79, 80, 81, 82

F

Fitzwater, James P., 331
Frank, Joseph Henry, 86
Frazier, Alexander, 85
French, Joseph L., 34, 87, 220
Fuller, William R., 72
Fullerton, Billie J., 88
Fulton, W. R., 89

G

Gable, Martha, 325, 326
Garry, Ralph J., 10, 90, 91
Geddes, Dorothy Clara, 92
Gerber, John C., 23
Glasgow, M. W., 93
Glock, John William, 94
Gold, Milton J., 262
Goldsmith, Peter B., 151
Gordon, Morton J., 95, 96
Gordon, Oakley J., 97, 98
Gould, Orrin Everett, 99
Graf, Raymond W., 8, 271
Grant, Theodore S., 100
Grate, John H., 54, 55
Greenhill, L. P., 40, 41, 101, 102, 103, 247, 282
Gropper, George L., 104, 105, 106, 107, 108
Gross, Edward, 57
Grosslight, J. H., 109, 150

H

Haake, Bernard F., 9
Hall, Joe, 111
Handleman, Stanley D., 112
Harby, S. F., 113
Hard, Gustav C., 114
Hardaway, Charles W., 115
Hardy, Frances, 315
Harris, Charles O., 116
Harris, Chester W., 117
Hartman, Frank R., 118, 119
Harty, Frances, 148
Hayman, John Luther, Jr., 120, 121, 122, 123
Head, Sydney W., 124
Heath, Robert W., 163, 164
Herminghaus, Earl G., 125
Himmler, Merwin Lewis, 126
Hirsch, Richard S., 127
Homman, Guy Burger, 128
Honig, Jurgen M., 269
Houston, Robert W., 59
Howe, Harold B., 129
Hudson, W., 130
Huffman, Stanley Ausburn, 131
Hunt, Lyman C., Jr., 132
Hurst, Paul M., Jr., 133, 134, 140
Husband, Richard Wellington, 26, 135

I

Insel, Shepard A., 136
Irwin, J. V., 138
Ivey, Sara M., 139

J

Jackson, Robert, 134, 140
Jacobs, James N., 54, 55, 141, 142, 143
Jacobson, Harvey K., 321, 322
Janes, Robert W., 144
Jantzen, Victor Warren, 145
Jaspen, Nathan, 15, 16

Jenkinson, Nelle Lee, 194
Johnson, F. Craig, 146, 147
Johnson, Grace Nichols, 148
Johnson, Hildegard Binder, 149
Johnson, James T., Jr., 122, 123

K

Kale, Shrikrishna Vasudeo, 150
Kanner, Joseph H., 151, 152, 153, 154, 155, 208, 253
Kantor, Bernard R., 157
Kaplan, Robert, 158
Karsner, Milo Gist, 159
Kasten, D. F., 160
Katz, Sanford, 151
Kazem, Ahmed Khairy Mohamed, 161
Keiffer, Mildred, 55, 143
Kelly, Fred C., 240
Kendler, Howard H., 162
Kendler, Tracy S., 162, 181
Ketcham, Carl H., 163, 164
Kimbie, G. A., 165
King, Calvin Elijah, 166
Kishler, John Pullman, 167
Klapper, Hope Lunin, 168
Kopstein, F. F., 188
Kraft, Mary Elizabeth, 10, 63, 90, 169
Krebs, Robert Edward, 170
Kuipers, Ray Harry, 171
Kumata, Hideya, 6, 31, 154, 172, 173, 231, 296, 297

L

Lallas, John E., 285, 286
Lane, Bennie Ray, 174
Laner, S., 175
Lastinger, R. Leroy, 255
LeAnderson, Robert Elmer, 176
LeMaster, Lelan Kenneth, 177
Lemke, Olga Marie, 178
Lepore, Albert R., 179
Lesser, Gerald S., 290
Levens, A. S., 180
Levine, Seymour, 162, 181, 208
Levinson, Elias, 182
Levonian, Edward, 183
Lofthouse, Yvonne Marie Sheriff, 184
Lottes, John J., Jr., 101, 187
Lumsdaine, Arthur A., 104, 105, 106, 107, 188
Lund, Kenneth W., 189

M

McAdams, Walter J., 80
McAshan, Hildreth H., 206
McClarty, Edward Leon, 195
Maccoby, Nathan, 207
McElroy, Clyde W., 196
McGrane, J. F., 197
McIntyre, Charles J., 50, 109, 150, 198
McIntyre, Kenneth M., 199
McNiven, Malcolm, 102, 200
Macomber, F. G., 190, 191, 192
McTavish, Chester Lynn, 201
Marshall, Wesley P., 152
Martin, Howard S., 193
Mauriello, Edna, 91
May, Mark A., 194
Meacham, Esther Anne, 202
Meierhenry, W. C., 203
Mercer, John, 204
Merrill, Irving R., 29, 205, 206, 287
Michael, Donald N., 207
Miller, J., 208
Minter, Philip C., 209
Mitchell, Clif, 210
Mitzel, Harold E., 262
Mobius, Joseph B., 323
Moldstad, John, 211
Moore, Charles, 82
Morgan, James Donald, 212
Moss, Roy B., 43
Mullin, Daniel W., 213
Muntone, John Christopher, 214
Murphy, Francis Eugene, 215
Murray, J. E., 249, 250
Myers, Lawrence, Jr., 216

N

Neale, Daniel Christopher, 217
Nearing, Charles Lynn, 218
Nee, Mary M., 75, 189
Neidt, Charles O., 34, 87, 220
Nelson, Courtenay M., 221
Nelson, Harold, 222, 223
Neu, D. Morgan, 224
Noall, Matthew F., 225
Nordquist, Edwin C., 98
Northrop, Dean S., 227
Nunnally, Nancy, 228

O

Ogilvie, J. C., 328
Ortgiesen, Leroy, 229

P

Pagano, A., 101
Painter, William I., 230
Parsons, T. S., 231
Pasewark, William Robert, 232
Patrick, Robert B., 233, 234
Paul, J., 328
Peerson, Nell, 235
Peterson, Eleanora L., 236
Peterson, Jack Arno, 237
Pflieger, Elmer F., 238, 239, 240
Philips, C. Lee, 124
Phillips, John Anderson, 241
Pitkin, Vernon, 242
Pollock, Thomas Clark, 243
Popham, W. James, 244, 258
Powers, Richard D., 209

R

Radlow, Robert, 246
Ramano, Louis, 252
Reede, Arthur H., 247
Reede, Roland K., 247
Reid, J. Christopher, 248
Rich, Owen S., 103, 247
Rock, Robert T., 249, 250
Rogers, Curtis A., 25
Rogers, William R., 251
Romano, Louis, 252
Roney, H. Burr, 80
Rosenstein, Alvin J., 153, 253
Rosselot, Lavelle, 254
Rothchild, Thomas H., 255
Rottman, Leon Harry, 256
Rumford, Herbert Paul, 257
Runyon, R. P., 154
Rupiper, O. J., 89

S

Sadnavitch, Joseph M., 244, 258
Sargent, Leslie W., 259
Scheller, Fred, Jr., 260
Schlaak, Franklin Ottmer, 261
Schlesinger, Kurt, 136
Schramm, Wilbur, 36
Schueler, Herbert, 262
Schwachtgen, Edward C., 75
Schwarzwalder, John C., 263
Scollon, Robert W., Jr., 264
Scott, Donald Thomas, 265
Seibert, Warren F., 72, 160, 266, 267, 268, 269
Shanks, Merril E., 72
Sheehan, A. Cornelia, 10, 63, 90, 169, 270
Sheldon, William, 8, 271
Shettel, H. H., 272
Shimberg, B., 273
Shipman, Virginia, 107
Short, James F., Jr., 57
Shupe, Donald R., 97
Siegel, Laurence, 190
Siegel, Sheldon L., 30
Silagyi, Dezo Vincent, 274
Skinner, Thomas Dibble, 275
Slattery, M. Jamesetta, 276
Smith, Herbert, 277
Smith, Hope M., 278
Smith, Ronald G., 81
Snyder, Vance Beidel, 279
Souder, Marjorie, 280
Southwestern Signal Corps Training Center, 281
Spencer, R. E., 282
Spigle, Irving Samuel, 283
Stake, Robert E., 284
Starlin, Glenn, 285, 286
Staub, Norman C., 287
Stein, J. J., 288
Stein, Sarah Christine, 289
Stoller, Nathan, 290
Strevell, Wallace H., 291
Stromberg, Eleroy L., 292
Stuit, Dewey B., 293
Suchy, Robert R., 294
Sulzer, R. L., 188
Sykes, Ronald E., 295

T

Tannenbaum, P. H., 296, 297
Tendam, D. J., 298
Thompson, Franklin James, 299
Throop, Joseph F., 300
Tiemans, Robert K., 301
Tintera, James B., 302
Toffel, George M., 303
Torkelson, G. M., 304
Twyford, Loran, 305

U

Ulrich, John Holway, 306

V

VanderMeer, A. W., 11, 223, 307, 308
Van Horn, Charles, 309
Vestal, Donald Adams, 310
Voorhies, William Thompson, 311
Vuke, George Joseph, 312

W

Walton, Norma Ruth, 313
Waters, Grace J., 315
Watson, Donald P., 114
Wedberg, Desmond P., 316
Weisgerber, Robert Arthur, 317
Wells, David Wayne, 318
Westley, Bruce H., 19, 319, 320, 321, 322, 323
Westover, Frederick L., 324
Wetter, Allen H., 325, 326
Wickline, Lee E., 327
Wieland, Betty A., 82
Williams, D. C., 328
Williams, Richard Henry, 329
Wilson, Jack D., 179
Wilson, Mamie T., 43
Winget, Lerue, 225
Wittich, Walter A., 330
Witty, Paul, 331
Wolgamuth, Dale, 332
Wulff, J. J., 165

Z

Zuckerman, John V., 333

Subject Index

[Numbers refer to Research Summary Number]

A

Ability and ability level 10, 11, 12, 24, 25, 27, 35, 42, 43, 52, 54, 55, 58, 61, 62, 63, 65, 67, 68, 69, 70, 72, 73, 75, 77, 79, 83, 87, 97, 104, 115, 121, 123, 124, 141, 142, 143, 146, 149, 152, 153, 154, 155, 157, 160, 161, 165, 168, 169, 171, 172, 175, 176, 177, 178, 182, 188, 191, 192, 193, 194, 200, 204, 207, 209, 211, 215, 225, 226, 227, 228, 242, 244, 246, 248, 253, 256, 257, 259, 267, 270, 276, 277, 280, 282, 285, 286, 290, 294, 303, 307, 310, 312, 318, 319, 320. (*See also* Intelligence.)
Ability, mechanical, 279
Achievement:
    Boys vs. girls. (*See* Sex.)
    Reading. (*See* Reading.)
    Scores, differences in, 1, 18, 70, 72. 73, 77, 85, 89, 148
    Student, 4, 5, 8, 11, 13, 18, 24, 25, 31, 34, 36, 38, 40, 41, 44, 48, 49, 51, 54, 57, 59, 60, 62, 65, 69, 70, 72, 74, 77, 79, 80, 85, 89, 92, 93, 97, 100, 103, 111, 116, 117, 128, 14, 142, 143, 146, 148, 154, 160, 166, 169, 174, 179, 185, 186, 188, 190, 191, 192, 193, 195, 200, 202, 210, 212, 217, 219, 225, 231, 238, 240, 241, 244, 247, 255, 256, 257, 258, 266, 267, 268, 277, 282, 284, 285, 286, 287, 291, 294, 297, 298, 303, 307, 312, 316, 318, 325, 326
Adaptation level, 17
Adjustment. (*See* Guidance instruction.)
Administrator, presentation of program by an, 329
Age, 1, 47, 77, 87, 112, 125, 140, 157, 58, 161, 182, 193, 196, 211, 251, 257, 302. (*See also* School, years of.)
Akron, University of, 230
Alabama:
    Mentioned, 235
    Schools, ITV chemistry instruction in, 303
    University of, 3, 51, 303, 324
Allen Attitude Scale. (*See* Tests, attitude.)
Allport-Vernon Study of Values. (*See* Tests, attitude.)
American Chemical Society-National Science Teachers Association Cooperative Chemistry Examination. (*See* Tests, chemistry.)
American Council on Education Psychological Examination for College Freshmen. (*See* Tests, intelligence.)
American University, 332
Analysis of covariance, 5, 12, 24, 27, 28, 31, 34, 40, 41, 44, 55, 57, 61, 66, 69, 77, 88, 89, 94, 101, 102, 103, 118, 120, 121, 122, 123, 124, 134, 139, 141, 142, 147, 149, 157, 164, 174, 179, 186, 200, 204, 210, 211, 221, 224, 226, 227, 229, 244, 249, 251, 256, 258, 263, 280, 285, 286, 288, 295, 298, 299, 301, 307, 332
Analysis of variance, 4, 16, 24, 27, 28, 32, 34, 40, 41, 44, 47, 50, 61, 62, 63, 65, 77, 86, 93, 98, 101, 102, 104, 105, 106, 108, 114, 119, 127, 142, 145, 147, 149, 155, 157, 169, 170, 172, 173, 174, 178, 182, 196, 197, 207, 212, 216, 230, 241, 247, 248, 251, 267, 269, 270, 286, 290, 291, 293, 297, 299, 306, 309, 319, 320, 321, 323, 324, 327, 328, 332
Anderson Chemistry Achievement Test. (*See* Tests, chemistry.)
Animated films. (*See* Film, animated.)
Anxiety:
    Chronic, inventory. (*See* Tests, personality and character.)
    Relation between scores and film learning, 7
Aptitude tests. (*See* Tests, intelligence.)
Arithmetic:
    Courses in. (*See* Courses and subjects, by grade level.)
    Scores of urban and rural students, 212
Arizona, University of, 163, 164
Arkansas, University of, 139
Armed Forces Qualification Test. (*See* Tests, intelligence.)
Army Command and General Staff College, 250
Army General Classification Test. (*See* Tests, intelligence.)
Army Mechanical Aptitude Test. (*See* Tests, aptitude.)
Army training. (*See* Military studies; *also* Training presentations.)
Art. (*See* Courses and subjects, by grade level.)
Articulation. (*See* Speech; *also* Pronunciation.)
Assignments of students or classes, 10, 24, 33, 40, 41, 63, 113, 169, 173, 179, 222, 270, 289, 292, 318
Attendance, class, 41, 69, 144
Attention, 22, 55, 168, 191, 224, 245, 265, 323
Attitude:
    Administrator, 115, 294, 329
    Authoritarian, 40, 79
    Behavioral choice measure, 41, 81, 97, 103, 144
    Businessmen, 110
    Community leader, 110, 314
    Instructor, 6, 13, 20, 23, 24, 39, 54, 58, 59, 65, 71, 81, 85, 87, 91, 92, 110, 112, 115, 122,

  126, 132, 148, 168, 179, 185, 187, 189, 190, 192, 199, 222, 225, 238, 244, 245, 261, 262, 265, 285, 286, 291, 294, 302, 304, 314, 320, 321, 329, 330, 331
  Instructor, over time, 39, 81, 115, 199
  Parent, 97, 110, 132, 148, 314, 329
  Relation of teacher-pupil. (*See* Student and teacher contact.)
  Student, 6, 10, 13, 17, 18, 20, 21, 22, 23, 24, 30, 32, 34, 38, 39, 40, 41, 44, 45, 47, 50, 54, 55, 57, 58, 60, 61, 65, 66, 67, 70, 71, 72, 73, 76, 78, 79, 82, 84, 85, 86, 87, 89, 91, 92, 97, 99, 102, 103, 108, 110, 115, 118, 124, 125, 126, 129, 132, 136, 137, 142, 144, 148, 154, 156, 160, 166, 168, 172, 173, 179, 183, 184, 185, 186, 187, 189, 190, 191, 192, 196, 198, 200, 203, 205, 206, 209, 214, 218, 220, 222, 225, 229, 231, 233, 236, 237, 238, 242, 243, 245, 247, 248, 250, 252, 255, 256, 257, 260, 261, 264, 265, 266, 267, 268, 270, 273, 274, 275, 281, 282, 283, 284, 285, 286, 291, 293, 297, 299, 300, 301, 304, 308, 309, 311, 313, 314, 317, 322, 323, 324, 326, 327, 331, 332
  Student, over time, 10, 20, 21, 22, 38, 39, 40, 41, 44, 58, 66, 72, 78, 79, 97, 108, 115, 172, 173, 179, 183, 190, 191, 192, 206, 207, 222, 231, 243, 247, 248, 261, 267, 270, 285, 311, 317, 321, 331
Auding abilities, 65, 195
Auding test. (*See* Tests, speech.)
Audio:
  Presentation, 86, 119, 175, 223, 224, 296, 308
  Sound track, 91, 165, 223, 296
Audiotape, use of, 71, 91, 93, 96, 122, 147, 302, 316. (*See also* Radio.)
Audiovisual materials:
  Evaluation, 199, 233
  Teachers's use of, 5, 65, 139, 199, 203, 330
Audiovox Audiometric Test. (*See* Tests, speech.)
Auditory Memory Span Test. (*See* Tests, speech.)
Aural-oral skills, 2, 11, 51, 92, 95
Australia:
  Commonwealth Office of Education, 52
  Junior technical school in, 52
Authoritarian personality, 40, 79, 214

B

Bernreuter Personality Inventory. (*See* Tests, personality and character.)
Bills-Vance-McLean Index of Adjustment and Values. (*See* Tests, personality and character.)
Biology, ITV courses in. (*See* Courses and subjects, by grade level, biology.)
Black and white films. (*See* Film, black and white.)
Blyth Second-Year Algebra Test. (*See* Tests, algebra.)
Boston University, 10, 90, 178
Brown-Carlsen Listening Comprehension Test. (*See* Tests, speech.)
Bryngelson and Glaspey:
  Picture Articulation Test. (*See* Tests, speech.)
  Speech Improvement Cards. (*See* Tests, speech.)

C

California:
  Achievement Test. (*See* Tests, Intelligence.)
  Algebra Aptitude Test. (*See* Tests, algebra.)
  Mental Maturity Index. (*See* Tests, personality and character.)
  Personality Inventory. (*See* Tests, personality and character.)
  Psychological Inventory. (*See* Tests, personality and character.)
  Reading Test. (*See* Tests, reading.)
  Schools, 67, 68, 157, 185, 186, 236
  Test of Mental Maturity. (*See* Tests, intelligence.)
  Test of Personality. (*See* Tests, personality and character.)
  Test of Social Sciences. (*See* Tests, social sciences.)
  University of, 1, 29, 67, 100, 180, 183, 278, 287
  University of Southern, 316
Calvert Science Information Test. (*See* Tests, science.)
Chemistry:
  ITV courses in high school. (*See* Courses and subjects, by grade level, chemistry.)
  John Baxter Chemistry films. (*See* John Baxter.)
Chicago City Junior College, 77
Child development. (*See* Courses and subjects, college level, psychology.)
Children. (*See* Student.)
Children, retarded. (*See* Retarded students.)
Chi-square analysis, 1, 50, 65, 67, 81, 108, 129, 136, 145, 173, 184, 193, 233, 237, 247, 285, 300, 317, 324
Choice of picture test. (*See* Tests, pictorial.)
Class (or classroom):
  Activities, types of. (*See* Assignments of students or classes.)
  Assignment. (*See* Assignments of students or classes.)
  Length of. (*See* Lesson, length of instruction; *also* Film, length of.)
  Observation. (*See* Observation.)
  Participation. (*See* Participation, student.)
  Racially mixed and unmixed. (*See* Race.)
  Size, 5, 18, 38, 41, 66, 87, 95, 148, 190, 192, 194, 217, 238, 240, 255, 278, 284
Closed-circuit television:
  As a medium of instruction. (*See* Instructional television.)
  Courses in. (*See* Courses and subjects, by grade level.)
  Determining attitudes about. (*See* Attitude.)
  Effectiveness of teachers. (*See* Instructor, effectiveness.)
College:
  Courses. (*See* Courses and subjects, college level.)
  Entrance Examination Board Physics Test. (*See* Tests, physics.)

  - Opportunities for home study. (*See* Viewers, off-campus.)
  - Qualification Test (*See* Tests, intelligence.)
- Colorado schools, 28, 120, 121, 122, 123
- Color film. (*See* Film, black and white and color.)
- Common Entrance Examination scores. (*See* Tests, intelligence.)
- Commonwealth Office of Education. (*See* Australia, Commonwealth Office of Education.)
- Communication:
  - Skills. (*See* Courses and subjects, by grade level, communication, English, speech.)
  - System. (*See* Feedback; *also* Talkback.)
- Communicator prestige. (*See* Instructor, prestige.)
- Connecticut schools, 76, 242
- Consulting services. (*See* Visits.)
- Content analysis of courses, 171, 179
- Continuing education. (*See* Education, continuing.)
- Cooperative:
  - Algebra Test. (*See* Tests, algebra.)
  - Biology Test. (*See* Tests, biology.)
  - Chemistry Test (*See* Tests, chemistry.)
  - English Test. (*See* Tests, English.)
  - General Science Test. (*See* Tests, science.)
  - Mathematics Placement Test. (*See* Tests, mathematics.)
  - Physics Test. (*See* Tests, physics.)
- Correlations used in studies, 3, 4, 17, 21, 22, 24, 32, 38, 41, 42, 51, 58, 67, 72, 79, 87, 89, 91, 93, 95, 98, 102, 112, 116, 117, 122, 133, 147, 169, 191, 192, 195, 200, 214, 224, 228, 246, 247, 248, 252, 258, 268, 269, 277, 283, 285, 301, 305, 308, 312, 333
  - Biserial, 116, 121, 230
  - Equivalent-form, 38, 160, 267, 268
  - Hoyt, 263, 287
  - Interrater, 51, 267
  - Kendall *W*, 309
  - Kuder-Richardson, 10, 168, 191, 204, 216, 223, 224, 316
    - No. 8, 4
    - No. 20, 41, 101, 117, 174, 269, 290
    - No. 21, 40, 102, 190, 282
  - Multiple, 31, 34, 158, 174, 202, 308
  - Odd-even, 41, 89, 93
  - Partial, 102
  - *Phi*, 82
  - Point biserial, 41
  - Rank order, 184, 247, 309
  - Split-half, 10, 65, 89, 93, 103, 120, 121, 123, 137, 149, 190, 191, 192, 229, 247, 282, 285, 295, 310
  - Test-retest, reliability, 233, 262, 264
  - Tetrachoric, 285
- Correspondence study courses, 34, 80, 219, 220, 231, 256, 318. (*See also* Education, continuing.)
- **Courses:**
  - Credit and non-credit, 98
  - Pretesting, 105, 107
- Courses and subjects used in teaching—
  - College-level:
    - Accounting, 77, 103, 286, 324
    - Advertising, 172, 173
    - Air science, 38, 190, 192, 214
    - Algebra, 101, 324
    - American literature, 77
    - Analytic geometry, 245
    - Anatomy, 62
    - Anthropology, 186, 328
    - Art education, 295
    - Astronomy, 77, 286
    - Audiovisual materials, use of. (*See* Audiovisual materials.)
    - Bacteriology, 245
    - Biology, 77, 80, 136, 186, 191, 286
      - Animal, 190
    - Broadcasting topics, 207
    - Business law. (*See* Law, business.)
    - Calculus, 72
    - Chemistry, 40, 41, 58, 201, 260, 269, 285, 286
    - Communication, 24, 33, 65, 136
    - Computer applications, 323
    - Creative arts, 65, 136, 179
    - Dentistry, 29, 100, 199, 296
    - Driving safety at night, 206
    - Economics, 65, 69, 103, 192, 195, 247
    - Education, 2, 46, 60, 66, 87, 89, 147, 217, 218, 233, 251, 257, 262, 290, 295, 299, 302, 304, 311, 316. (*See also* Observation.)
    - Educational psychology, 44, 70, 191, 230, 285, 286
    - Electricity and magnetism, 118, 197
    - Electronics, 31
    - Engineering, 30, 98, 116, 118, 180, 197, 201, 266, 300, 305
    - English, 124, 168, 179, 186
      - Composition, 35, 243, 267, 282, 285, 286
      - Literature, 23, 77, 164, 243, 285, 286. (*See also* Courses and subjects, college-level, communication, reading.)
    - Flying, high altitude, 14
    - Food service, Army ROTC, 6
    - French, 254
    - Geography, 149, 186, 286
    - Geometry:
      - Analytic, 245
      - Descriptive, 129
    - Government, 190, 245, 293
    - Greeks and the Bible, 293
    - Group dynamics, 332
    - Health education, 158, 186
    - Hearing testing technique, 138
    - History, 117, 124, 168, 183, 186, 260, 275, 285, 286
    - Home economics, 201, 202
    - Human behavior. (*See* Courses and subjects, college-level, psychology.)
    - Humanities, 77
    - Hygiene, 286
    - Industrial arts, 175
    - Language, 77, 184, 311
    - Law, business, 41, 77
    - Listening, 33, 146

  Logic, 124
  Man's cultural heritage, 168
  Mathematics, 4, 77, 166, 174, 268, 311
  Measuring instruments, precision, 305
  Mechanics, 118
  Medicine, 1, 45, 273
  Meteorology, 41, 286, 300
  Music, 41, 77, 186
  Nursing, 1, 273
  Ocean survival, 14
  Orthogonal projection, 185
  Pharmacy, 287
  Physical education, 159, 278, 280
  Physical science. (*See* Science, physical.)
  Physics, 18, 58, 118, 186, 201, 298
  Physiology, 191, 192, 287, 297
  Political science, 77
  Psychology, 7, 17, 26, 40, 41, 65, 77, 78, 79, 80, 82, 89, 135, 136, 167, 179, 190, 192, 195, 231, 285, 286, 292
  Reading. (*See* Reading.)
  Religion, 167, 293
  Repair a window, 175
  Russian, 109, 150
  Safety, 14
  School in American life, 89, 285, 286
  Science, 58, 114, 179
    Physical, 77
  Scientific method, 58
  Shorthand, 77
  Slide rule, 98
  Social science, 77, 144, 172, 179, 311
  Sociology, 17, 41, 57, 191, 332
  Spanish, 36, 51, 205
  Speech, 32, 48, 49, 77, 138, 146, 186, 196, 222, 248. (*See also* Courses and subjects, college-level, communication, listening.)
  Student teaching. (*See* Courses and subjects, college-level, education, observation, teacher training.)
  Trigonometry, plane, 25
  Zoology, 103, 191
Elementary school:
  Ants, 53
  Art, 111, 148
  Biology, 55, 111, 211, 255, 325
  Civics, 111, 156
  Electricity, 37, 115
  English, 111, 211
  French, 91
  Geometry, 148
  Health, 43, 239, 294
  History, 111, 156
    American, 148, 255
  How TV works, 53
  Light, 53
  Making glass for houses, 53
  Mathematics, 255
  Music, 111
  Physical science, 325
  Reading. (*See* Reading.)
  Rock pool, 53
  Safety, 43, 111, 294
  Science, 9, 90, 111, 148, 156, 211, 239, 294, 326
  Social studies, 255, 325
  Spanish, 111, 123, 148, 156
  Spider, 53
  Using radio and TV, 93
Kindergarten, 228
Grade, intermediate:
  Ants, 53
  Art, 261
  Rock pool, 53
  Safety, 294
  Science, 54, 148, 261
  Spanish, 148
  Spider, 53
Grade, third:
  Course in, 85
  French, 274
  Science, 85
  Spanish, 238
  Speech, 95, 96, 139
Grade, fourth:
  Mathematics, 59, 321
  Reading. (*See* Reading.)
  Russian, 97
  Science, 85
  Spanish, 121, 274
  Spelling, 241
Grade, fifth:
  Arithmetic, 126
  Arts, 148
  Constitution, 22
  Electricity, 37
  French, 91, 126
  Health, 238, 274
  History, 22
  Language arts, 326
  Mathematics, 59
  Monarch butterfly, 28
  Phone, 176
  Reading. (*See* Reading.)
  Russian, 97
  Science, 55, 148, 238, 252, 263, 274
    Natural, 10, 63, 169, 270
  Social studies, 276
  Spanish, 120, 122, 148, 274
  United Nations, 22
Grade, sixth:
  Arithmetic, 210
  Art, 261
  Arts, 148
  Current events, 319
  French, 91
  Guidance, 178
  Language, 210
  Mathematics, 59
  News programs, 320
  Reading. (*See* Reading.)
  Science, 54, 74, 141, 148, 252
  Spanish, 122, 148
  Spelling, 210
Grade, seventh:
  Airplanes, 106
  Chemistry, 106
  Light, 215

  - Mathematics, 54, 55, 143
  - Plant life, 211
  - Science, 106, 108, 157, 210, 215. 252, 312
  - Sewing, 209
- Grade, eighth:
  - Airplanes, 106
  - Chemistry, 106
  - Food resources of Africa, 306
  - History, 148, 259
  - Home economics, 236
  - Mathematics, 226
  - Monarch butterfly, 28
  - Science, 106, 108, 131, 238, 317
  - Western films, 259
- Grade, ninth:
  - Algebra, 27, 322
  - Atomic energy, 201
  - Biology, 142
  - Chemistry, 201
  - English composition, 125
  - History:
    - American, 259
    - World, 238
  - Home economics, 201, 236
  - Mathematics, 321
  - Science:
    - General, 47, 125, 148, 307, 308
    - Physical, 226
  - Soil conservation, 229
  - Western films, 259
- Grade, tenth:
  - Biology, 161, 210, 327
  - English, 210
  - Geometry, 27, 148
  - History, 226, 259
  - Mathematics, 92
  - Science, 214, 308, 317
  - Slide rule, 11
  - Western films, 259
- Grade, eleventh:
  - American literature, 238
  - Chemistry, 327
  - Choosing your occupation, 88
  - Earning power, 88
  - English, 282
  - Heredity, 88
  - History, American, 210, 226
  - Library, 88
  - Mathematics, 92
  - Space, exploration, 213
- Grade, twelfth:
  - Atomic energy, 102, 200, 201
  - Automobile, 102, 200
  - Chemistry, 56, 201
  - Driver education, 56
  - Earning power, 88
  - English, 282
  - First aid, 102, 200
  - Government, 145
  - Heredity, 88
  - Library organization, 88
  - Nutrition, 201
  - Occupation, choice of, 88
  - Physics, 327
  - Typewriting, 232, 289
- High school:
  - Algebra, 13, 189, 219, 256, 301, 309, 318
  - Arithmetic, 212
  - Art, 148, 179, 256
  - Atomic energy, 102, 104, 170, 200, 201
  - Bacteriology, 245
  - Biological sciences. (*See* Science, biological.)
  - Chemistry, 9, 34, 128, 170, 201, 221, 244, 256, 258, 303, 327
  - Civics, 67, 68, 145
  - Civilian defense, 207
  - Creative arts, 179
  - Driver's education, 56
  - Economics, 67, 68
  - Electricity, 208, 310
  - English, 124, 179, 193, 194, 210, 219, 220, 256
  - French, 254
  - Geometry, 8, 27, 148, 219, 220, 245, 256
  - Government, 67, 145, 245
  - Help wanted, 67, 68
  - History, 124, 210, 294
    - American, 5, 148, 277
    - World, 5, 239, 277
  - Home economics, 201
  - Industrial arts, 102, 279, 305
  - Logic, 124
  - Map reading, 162
  - Mathematics, 61, 219, 256
  - Measuring instruments, precision, 305
  - Military service, 283
  - Modern problems, 5
  - Petroleum, 170
  - Physical science, 325
  - Physics, 5, 34, 75, 102, 104, 170, 189, 200, 201, 219, 225, 244, 256, 258, 265, 291. (*See also* Courses, high school, atomic energy; *also* Harvey White Physics film.)
  - Psychology, 5, 179
  - Science:
    - Biological, 5, 12, 161, 210, 294, 325, 326, 327
    - General, 5, 61, 179, 277
    - Social, 67, 179, 237, 325
  - Social science. (*See* Science, social.)
  - Spanish, 3, 51, 148, 219, 256, 284
  - Speech, 73, 96
  - Typewriting, 289
- Junior high school:
  - Airplanes, 106
  - Algebra, 27
  - Art, 111
  - Biology, 54, 55, 325
  - Chemistry, 106, 107
  - Civics, 67, 68, 111
  - English, 111, 182, 239
  - French, 254
  - Geography, 185
  - Geometry, 148
  - Health, 239
  - Heat, 104, 107
  - History:
    - American, 111, 148
    - World, 239

        - How movies work, 105
        - Industrial arts, 177
        - Mathematics, 326
        - Music, 111
        - Physical education, 185
        - Physical science, 108, 325
        - Physics, 104, 105, 107, 185
        - Safety, 111
        - Science, 76, 106, 147, 239, 294
            - Biological, 111, 325
            - General, 76, 111, 294
            - Physical, 325
        - Social studies, 237, 294, 325
        - Spanish, 111
        - Speech, 73
        - Typewriting, 289
    - Military studies:
        - Airplane, 272, 333
        - Atomic defense, 134, 140
        - Breechblock assembly, 15, 16
        - C ration, 264
        - Chemical warfare, 227
        - Cold weather uniforms, 198
        - Communism in China, 205
        - Constant runout valve, 71
        - Driving, 205
        - Electricity, 151
        - Electronics, 31, 64, 153
        - Food service, 6
        - Fire control, 227
        - Hunting animals, 204
        - Joint Message Form, preparation of, 281
        - Maps, world, 181
        - Measuring instruments, 134, 224, 246, 288
        - Meteorology, 223, 246
        - Micrometer, 188
        - Mirror deck landing sight, 71
        - Missile systems, 253
        - Oxygen breathing apparatus, 204
        - Photography, 153
        - Police support in emergencies, 137
        - Power maintenance, 155
        - Power plant, removal of, 42
        - Rations, individual combat, 264
        - Riot control, 137
        - Rope, use of manila and wire, 134
        - Science, instruction, military, 160
        - Slide rule, 165
        - Survival, 134, 227
        - Training, 84, 127, 152, 154, 227, 249, 250
        - Weather, 86, 223, 246, 288
        - Window, repair, 175
    - Public school, 83, 156, 212, 239, 240, 325, 326
- Critical ratio, 161, 300
- Critical thinking, 77, 179, 216, 294
- Cummings World History Test. (*See* Tests, history.)
- Curriculum, 115, 184, 251

D

- Davis Test of Functional Competence in Mathematics. (*See* Tests, mathematics.)
- Demonstration method of presentation, 29, 41, 62, 100, 103, 107, 108, 113, 116, 126, 130, 131, 138, 159, 177, 178, 179, 187, 222, 273, 279, 285, 287, 296, 298, 309
- Dentistry courses. (*See* Courses and subjects, college-level, dentistry.)
- Detroit:
    - Alpha Intelligence Test. (*See* Tests, intelligence.)
    - Test of Learning Aptitude. (*See* Tests, intelligence.)
    - University of, 36
- Diagnostic Reading Test. (*See* Tests, reading.)
- Differential Aptitude Test. (*See* Tests, intelligence.)
- Difficulty level, 28, 209, 211. (*See also* Readability; *also* Listenability.)
- Discussion, method used in teaching, 23, 25, 32, 41, 52, 59, 65, 70, 77, 78, 80, 110, 120, 178, 136, 168, 179, 184, 193, 196, 202, 214, 260, 285, 286, 293, 296, 300, 320
- Dissonance theory, 81
- Dixon-Mood sign test, 330
- Dogmatism. (*See* Tests, personality and character.)
- Drama. (*See* Courses and subjects, high school.)
- Dramatic-historical film. (*See* Film, dramatic-historical.)
- Dramatization, 41, 139, 193, 249, 250
- Dunning Physics Achievement Test. (*See* Tests, physics.)

E

- Education, continuing, 1, 33. (*See also* Correspondence study courses.)
- Educational Testing Service Cooperative Test. (*See* Tests, French; mathematics; Spanish.)
- Edwards Personality Preference Schedule. (*See* Tests, personality and character.)
- Eidophor large-screen television projector. (*See* Screen, large.)
- Eighth-grade courses. (*See* Courses and subjects, grade, eighth.)
- Eleventh-grade courses. (*See* Courses and subjects, grade, eleventh.)
- Encyclopaedia Britannica films, 244, 258
- English. (*See* Courses and subjects, by grade level, English.)
- Environment, effects upon retention, 214
- Examinations. (*See* Tests, essay, film, matching, midterm, multiple-choice, performance, pictorial, true-false, and by subjects.)
- Experience:
    - Attitude toward instruction and program. (*See* Attitude.)
    - Rating observation. (*See* Observation.)
    - School methods course, 257
    - Student, with television courses, 87, 250, 258, 279
    - Teachers using ITV. (*See* Instructor.)
- Eye contact in ITV, effects of, 50, 323

F

Face-to-face instruction, comparison of methods of presentation. (*See* Instructional television.)
Factor analysis, 21, 81, 246, 321
Facts About Science Test. (*See* Tests, science.)
Fear, attitude of, 33, 205
Feedback, 1, 70, 106, 112, 122, 127, 146, 249, 313, 332. (*See also* Talkback, student-teacher contact.)
Fifth-grade courses. (*See* Courses and subjects, grade, fifth.)
Film:
  Analyzer, 148, 305
  And teacher training, 147, 230
  Animated, 67, 84, 129, 188, 223, 249, 310
  Audience tailored, 183
  Black and white and color, 67, 88, 109, 116, 130, 140, 153, 197, 253, 308, 333
  Clips, use of 16 mm, 113, 329
  Continuous, 209
  Dramatic-historical, 161, 194, 249
  Effectiveness of teaching with, 5, 12, 14, 25, 28, 42, 43, 44, 47, 52, 53, 58, 66, 67, 68, 71, 76, 79, 89, 93, 94, 99, 102, 109, 113, 116, 117, 118, 119, 127, 128, 131, 133, 138, 140, 147, 150, 163, 164, 165, 167, 170, 175, 176, 177, 178, 180, 181, 182, 183, 188, 196, 197, 200, 201, 204, 206, 207, 208, 209, 211, 221, 224, 225, 227, 228, 229, 230, 233, 234, 236, 237, 244, 246, 252, 254, 258, 259, 264, 265, 272, 276, 277, 283, 288, 298, 299, 301, 305, 308, 309, 310, 312, 316, 327, 331, 333
  Humorous, used, in teaching, 68, 198
  Introductions used with, 7, 52, 88, 102, 133, 134, 140, 162, 200, 207, 215, 275, 329
  Length of, 67, 194, 224
  Loops, 113, 159, 278, 289
  Narration. (*See* Narration.)
  Perceived usefulness of, 102, 200
  Producing, 76, 81, 230, 279
  Questions inserted into, 104, 105, 106, 157, 209, 312
  Silent vs. sound, 53, 71, 84, 109, 150
  Sound slide, 188, 276
  Supplementary, 66, 233, 234
  Test. (*See* Tests, film.)
  Time given for, 89
  Titles, 198, 208, 227
  Used to improve reading, 94, 194, 228, 229, 331
  Viewings. (*See* Viewings, number of.)
Filmograph, learning from, 137
Filmstrip, 175, 176, 229, 276, 333
  Sound, 296, 316
Flanagan critical incident technique, 136
Florence State College (Alabama), 235
Florida:
  Dade County public schools, 111, 210
  Miami public schools, 210
  West coast project, 255
Followup. (*See* Practice.)
Ford Foundation, 83, 240, 325
Fordham University, 84
Foreign languages. (*See* Courses and subjects, by grade level.)
Fourth-grade courses. (*See* Courses and subjects, grade, fourth.)
French. (*See* Courses and subjects, by grade level.)
Freshman Orientation English Test. (*See* Tests, English.)
Fund for the Advancement of Education, 83, 240, 325

G

Galvanic skin response, 22
Garman-Schrammel Algebra Test. (*See* Tests, algebra.)
George Peabody College, 174
Gifted students. (*See* Ability.)
Goal distance, psychological. (*See* Film, perceived usefulness of.)
Grades and grade-point average, 18, 20, 21, 23, 25, 30, 40, 65, 66, 69, 71, 72, 80, 82, 87, 89, 94, 97, 98, 115, 120, 121, 123, 135, 144, 149, 158, 166, 168, 172, 173, 179, 184, 191, 192, 195, 202, 218, 221, 222, 234, 243, 248, 251, 258, 283, 290, 297, 300, 302, 306, 328
Graduate student assistant. (*See* Instructor, graduate assistant, prestige.)
Graeco-Latin square design, 1, 209
Grambling College (Louisiana), 43
Graves Design Judgment Test. (*See* Tests, art.)
Greene-Stapp Language Ability Test. (*See* Tests, intelligence.)
Grouping, homogeneous, 27, 55, 69, 143, 291
Guidance instruction, 88, 89, 165, 178
Guilford-Zimmerman Aptitude Survey. (*See* Tests, intelligence.)
Guttman attitude scaling. (*See* Tests, attitude.)

H

Hagerstown, Maryland. (*See* Maryland, Washington county.)
Harvey White physics films, 34, 118, 225, 265
Hawaii, Oahu, public schools, 95, 96
Hawthorne effects, 187
Hearing. (*See* Auding abilities; Courses and subjects, by grade level, speech; Listening comprehension.)
Henmon-Nelson Test of Mental Ability. (*See* Tests, intelligence.)
High school courses. (*See* Courses and subjects, high school.)
Hills Economics Tests. (*See* Tests, economics.)
Home:
  Activities and practices. (*See* Assignments of students or classes.)
  Viewing of broadcasts. (*See* Viewers, off-campus.)
Homework. (*See* Assignments of students or classes.)
Homogeneous grouping. (*See* Grouping, homogeneous.)
Horrocks and Troyer Tests of Human Growth and Development. (*See* Tests, personality and character.)
Houston, University of, 80, 81, 82, 291
Humorous film. (*See* Film, humorous.)
Hunter College, 262, 290

I

- IBM machines. (*See* Machines, IBM.)
- Identification, 136, 167, 182, 264
- Illinois:
  - Chicago elementary schools, 306
  - Chicago high schools, 75, 189
  - Study of pupils and teachers in, 115
  - University of, 30, 48, 49, 50, 280, 296, 297, 309
- Illusionistic representation, learning from, 137
- Image magnification. (*See* Magnification of visuals.)
- Income level, relation to family. (*See* Socioeconomic status.)
- Independent study. (*See* Study, habits.)
- Indiana:
  - Bloomington school, 211
  - State College, 115
  - Study of pupils and teachers in, 115
  - University, 28, 311
- Industrial Arts Test. (*See* Tests, industrial arts.)
- Instructional television, face-to-face teaching compared with ITV teaching, 3, 4, 6, 8, 10, 11, 18, 20, 23, 24, 25, 26, 27, 30, 31, 35, 36, 39, 40, 41, 47, 48, 49, 50, 51, 54, 57, 62, 64, 65, 66, 70, 72, 74, 77, 80, 83, 84, 87, 92, 95, 96, 97, 98, 99, 100, 101, 103, 104, 105, 106, 110, 111, 115, 120, 125, 126, 128, 135, 136, 141, 143, 145, 148, 149, 152, 154, 155, 156, 160, 166, 168, 171, 172, 173, 178, 179, 184, 185, 186, 187, 189, 190, 191, 192, 193, 195, 202, 210, 212, 214, 219, 220, 222, 226, 232, 235, 238, 239, 242, 243, 248, 249, 251, 255, 256, 257, 266, 267, 268, 269, 271, 273, 274, 280, 282, 284, 285, 286, 291, 292, 293, 295, 297, 299, 300, 303, 304, 313, 315, 318, 322, 324, 325, 326, 328
- Instructions, film. (*See* Film, introductions used with.)
- Instructor, 12, 87, 159, 174, 218, 264
  - Attitude. (*See* Attitude, instructor.)
  - Distance from, 41
  - Education. (*See* Instructor, training; Courses and subjects, college-level, education; Observation.)
  - Effectiveness, 97, 191, 330
  - Evaluation, 87, 166, 172
  - Experience, 3, 5, 48, 49, 51, 89, 91, 96, 112, 122, 123, 154, 155, 160, 168, 216, 222, 225, 233, 234, 248, 257, 280, 285, 302, 303, 318, 329
  - Graduate student assistant, use of, 38, 41, 48, 49, 69, 72, 222, 260, 268, 280
  - Motivation. (*See* Motivation.)
  - Number of, 4, 23
  - Participation. (*See* Discussion; *also* Participation.)
  - Preparation, 5, 91, 122, 302
  - Prestige, 38, 41, 108, 167, 172, 222, 264, 275, 329. (*See also* Proctor; graduate assistant.)
  - Rating by, 29, 42, 147, 251, 301, 313
  - Rating of, by students, 57, 147, 251
  - Rating scale, 190, 192
  - Training, 5, 10, 37, 45, 46, 59, 63, 92, 93, 96, 123, 132, 139, 147, 148, 155, 169, 178, 225, 230, 233, 234, 262, 270, 280, 291, 302, 303, 304, 309, 318, 321, 330
  - Traits, 87, 216
- Instudio class, 9, 40, 41, 48, 66, 106, 120, 135, 138, 146, 172, 173, 186, 281, 293, 297, 304, 313, 332
- Intelligence, 8, 10, 11, 12, 24, 25, 27, 35, 37, 39, 42, 43, 47, 52, 54, 55, 58, 60, 61, 62, 63, 65, 66, 67, 69, 70, 72, 73, 75, 79, 83, 87, 94, 96, 97, 104, 115, 120, 121, 123, 125, 126, 141, 142, 148, 149, 151, 152, 153, 154, 155, 157, 160, 161, 165, 168, 169, 170, 171, 175, 176, 178, 179, 182, 188, 190, 191, 192, 193, 194, 198, 200, 204, 209, 210, 215, 224, 225, 227, 228, 242, 246, 247, 248, 253, 256, 257, 259, 267, 270, 276, 277, 280, 283, 285, 286, 294, 303, 307, 310, 312, 318, 319, 320, 332. (*See also* Tests, intelligence.)
- Intensive television. (*See* Television, intensive.)
- Interest. (*See* Attitude; Motivation.)
- Interview, 3, 32, 51, 79, 81, 85, 110, 124, 132, 144, 185, 220, 228, 233, 260, 262, 264, 285, 286, 311, 317
- Inventory of Beliefs. (*See* Tests, personality and character.)
- Involvement, student. (*See* Student, involvement.)
- Iowa:
  - Physics Aptitude Examination. (*See* Tests, physics.)
  - Schools, algebra students in, 301
  - Silent Reading Test. (*See* Tests, reading.)
  - Test of Basic Skills, Form II. (*See* Tests, intelligence.)
  - University of, 21, 22, 23, 24, 159, 293, 301, 306
- Item analysis, 44, 89, 116, 155, 182, 263, 287, 290

J

- John Baxter chemistry films, 34
- Judges, evaluation rating. (*See* Ratings.)
- Jung, Carl, interview with, 79
- Junior high school courses. (*See* Courses and subjects, junior high school.)

K

- Kansas:
  - Schools, 12, 145, 258
  - State teachers colleges, 44, 244, 257, 258
  - University of, 128
- Kendall W. (*See* Correlation, Kendall W.)
- Kindergarten. (*See* Courses and subjects, kindergarten.)
- Kinescope:
  - Comparison of face-to-face presentation with, 24, 26, 75, 84, 216, 249
  - Effective use of, 1, 24, 26, 32, 73, 84, 98, 114, 116, 135, 147, 154, 155, 180, 217, 218, 231, 259, 262, 263, 275, 290, 296, 302, 304, 305, 330
  - Film recognition, 133, 134, 140
  - Used as a teaching supplement, 174

  Used in solving problems by thought-model process, 180
Knowledge:
  Initial level of, 31, 168
  Of results, 106, 127, 207, 288. (*See also* Feedback.)
Kruskal-Wallis analysis of ranks, 174
Kuder Preference Record, Vocational. (*See* Tests, personality and character.)
Kuder-Richardson. (*See* Correlation, Kuder-Richardson.)
Kuhlmann-Anderson Test of Mental Ability. (*See* Tests, intelligence.)

L

Laboratory:
  Dental, 29, 100
  Evaluation of performance in, 29, 99, 100, 202, 269
  Facilities, 225, 303
  Materials testing, 116, 300
  Problems, 129
  Use of ITV in, 62, 287, 300
Language:
  Ability. (*See* Ability and ability level.)
  Arts, 326
  Media for teacher preparation. (*See* Instructor, preparation, training.)
  Methods and materials. (*See* Courses and subjects, by grade level.)
Lankton First-Year Algebra Test. (*See* Tests, algebra.)
Latin square design, 201
Learn to Spell series. (*See* Spelling, Learn to Spell series.)
Learning:
  And anxiety, 7
  And attitude, 22, 24, 38, 40, 41, 122, 144, 167, 192, 268, 305, 308, 313
  And motivation, 7
  And notetaking, 14
  And repetition. (*See* Repetition.)
  And supplementary instruction, 12
  Continuous presentation, 151
  Effect of viewer participation upon, 1, 16
  Estimation of, by instructors, 54, 189, 190, 192, 294
  Estimation of, by students, 6, 23, 40, 41, 99, 110, 125, 184, 185, 191, 196, 245, 265, 274, 293, 305
  Factual and complex, 28, 41, 67, 88, 137, 170, 228
  Group, 1, 8, 12, 26, 27, 30, 40, 41, 42, 44, 45, 50, 52, 54, 55, 57, 59, 60, 61, 63, 64, 65, 66, 67, 71, 72, 74, 75, 76, 77, 79, 80, 83, 84, 85, 86, 89, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 109, 111, 114, 116, 117, 118, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 172, 173, 174, 175, 177, 179, 180, 181, 184, 185, 186, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 200, 201, 202, 203, 204, 206, 216, 207, 208, 209, 211, 212, 213, 214, 215, 219, 220, 221, 222, 223, 224, 225, 226, 227, 229, 230, 231, 232, 235, 236, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 252, 253, 254, 255, 256, 257, 258, 259, 262, 263, 266, 267, 268, 269, 271, 272, 273, 275, 276, 277, 279, 280, 282, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 300, 301, 303, 305, 306, 307, 308, 309, 310, 312, 313, 316, 318, 319, 320, 324, 325, 326, 328, 331, 333
  Interference and, 14
  ITV and face-to-face, 23
  Motor skills. (*See* Performance and learning.)
  Rate, 16, 33, 284
  Retarded students. (*See* Retarded students.)
  Verbal and nonverbal, 308
Lecture method of instruction:
  Effectiveness of use of, 20, 23, 32, 57, 117, 120, 183, 299, 306
  Used with consultant services. (*See* Visits.)
  Used with demonstration. (*See* Demonstration.)
  Used with discussion. (*See* Discussion.)
  Used with film or visual aids. (*See* Film; Visualization.)
  Used with slides. (*See* Slides.)
  (*See also* Instructional television.)
Lesson:
  Frequency of, 74, 122, 296
  Guide utilization, 10, 46, 37, 63, 169, 189, 270, 273, 307
  Length of instruction, 6, 85, 151. (*See also* Television, intensive.)
  Organization, 16, 29, 32, 105, 109, 113, 159, 166, 189, 208, 209, 227
  Pacing, 16, 55, 126, 265
  Supplementary, 74, 118, 122, 303
  Variety, 126
Likert scaling, 87, 112, 115, 158, 199, 216, 220, 244, 285, 321
Listenability level, effect upon learning, 28
Listening comprehension, 28, 33, 41, 91, 106, 120, 121, 122, 123, 139, 238, 239, 254
Lorge-Thorndike Non-Verbal Intelligence Tests. (*See* Tests, intelligence.)
Los Angeles:
  City College, 186
  Valley College, 186
Louisiana public school, study of films used for mentally retarded, 43

M

Macalester College (Minnesota), 149
Machines, IBM, 20
Magnification of visuals, 41, 62, 304. (*See also* Demonstration.)
Maine:
  Portland schools, 178
  State Department of Education, 61

- Manipulative Industrial Arts Test. (*See* Tests, industrial arts.)
- Mann Whitney *U* test, 244, 312, 317
- Martin, Edgar W., criteria for science education, 12
- Maryland, Washington County, progress report on effectiveness of ITV, 110, 212, 314
- Massachusetts:
  - Boston schools, 91, 169, 270
  - Council for Public Schools, 91
  - Schools, 10
- Matched subjects, 2, 8, 11, 18, 40, 53, 72, 75, 77, 80, 94, 112, 114, 125, 126, 133, 134, 140, 141, 148, 152, 153, 154, 161, 176, 179, 184, 191, 193, 194, 223, 227, 232, 239, 253, 257, 259, 267, 279, 288, 297
- Mathematics. (*See* Courses and subjects, by grade level.)
- McGraw-Hill and Indiana University films, 2, 99
- Mechanical ability. (*See* Ability, mechanical; Tests, aptitude, mechanical.)
- Median test, 129
- Medical studies. (*See* Courses and subjects, college-level, medicine.)
- Metropolitan Achievement Tests. (*See* Tests, intelligence, reading.)
- Metropolitan Intermediate Arithmetic Test. (*See* Tests, mathematics.)
- Miami University, 190, 191, 192
- Michigan:
  - Detroit public schools, 161, 238, 239, 274
  - Schools, 73, 161, 302
  - State University, 116, 172, 173, 206, 218
  - University of, 36, 231, 275
- Midwest Program on Airborne Television Instruction, 115
- Military studies. (*See* Courses and subjects, military studies.)
- Miller Analogies Test. (*See* Tests, intelligence.)
- Millersville State College (Pennsylvania), 295
- Minnesota:
  - Mining and Manufacturing Co., ITV course with reading assignments, 33
  - Multiphasic Personality Inventory. (*See* Tests, personality and character.)
  - Scholastic Aptitude Test. (*See* Tests, intelligence.)
  - St. Paul public school, 263
  - Teacher Attitude Inventory. (*See* Tests, attitude.)
  - University of, 2, 33, 99, 299
- Missouri:
  - Kansas City public schools, 156
  - University of, 87, 122, 248
- Mockups, used in mobile training, 272
- Modern School Achievement Test. (*See* Tests, achievement.)
- Monitors, number and use of, 138, 295, 311
- Mooney Problem Check List. (*See* Tests, personality and character.)
- Moore Castore test. (*See* Tests, intelligence.)
- Motion pictures. (*See* Film.)
- Motivation, 7, 52, 58, 77, 78, 94, 108, 122, 140, 154, 159, 171, 179, 181, 192, 194, 200, 207, 213, 286, 301, 317, 324, 328. (*See also* Instructor, motivation.)
- Motor skills. (*See* Performance.)
- Multiple Aptitude Test. (*See* Tests, intelligence.)
- Multiple regression. (*See* Correlation, multiple.)

N

- Narration:
  - And animated presentation, 84, 223, 249
  - Effect of film upon learning, 28, 43, 182, 211, 249, 250
  - Effect of film variables in, 211, 223, 264
  - Still and motion pictures, used with, 150, 264
  - Types of, 28, 68
  - With improved intelligibility, 212, 223
- National Experiment in ITV teaching in large classes, 325, 326
- Navy General Classification Test. (*See* Tests, intelligence.)
- Nebraska:
  - Secondary schools, 5, 237, 284, 318
  - University of, 5, 193, 203, 219, 220, 237, 284, 310
- Negro schools, TV instruction in, 148
- Nelson Biology Test. (*See* Tests, biology.)
- New Jersey, Newark schools, 182
- New York:
  - Schools, 8, 9, 39, 92, 276
  - State Regents Examination. (*See* Tests, intelligence.)
  - University, 35, 168, 182
- Ninth-grade courses. (*See* Courses and subjects, grade, ninth.)
- Noise level, ambient, 196
- Nonverbal learning. (*See* Learning, verbal.)
- North Carolina:
  - Schools, 226
  - University of, 199, 226
- Northwestern University Interest Inventory. (*See* Tests, attitude.)
- Note-taking:
  - During film viewing, 14, 66, 103, 164, 209, 216, 245, 266, 295
  - Responses when taking, 50
- Notes, review of, 14
- Nursing. (*See* Courses and subjects, college-level.)

O

- Oberlin College, 254
- Observation, 2, 46, 60, 89, 99, 136, 144, 168, 217, 218, 230, 233, 234, 251, 257, 262, 290, 295, 299, 302, 309, 311, 316. (*See also* Courses and subjects, college-level, education.)
- Occupation, parent, 97, 157, 169
- Off-campus ITV. (*See* Viewers, off-campus.)
- Ohio:
  - Cincinnati public schools, 54, 55, 56, 141, 142
  - Colleges, 254
  - Columbus schools, 261
  - Every Pupil Physics Test. (*See* Tests, physics.)
  - State Psychological Examination. (*See* Tests, intelligence.)
  - State University Mathematics Placement Test. (*See* Tests, mathematics.)
  - State University, 85, 158
  - University, 147

Oklahoma:
  Schools, 34
  University of, 88, 89, 93
Open-circuit television:
  Effectiveness of, 1, 6, 10, 13, 25, 33, 45, 48, 49, 65, 74, 77, 80, 118, 124, 125, 132, 144, 149, 179, 187, 226, 235, 242, 250, 273, 292, 294, 319, 320, 325, 326
  Inter-institutional use, 285, 266
Opinion, student. (*See* Attitude, student.)
Oregon:
  State schools, 260, 289
  State system of higher education, 285, 286
Organization. (*See* Lesson, organization.)
Otis:
  Intelligence Test. (*See* Tests, intelligence.)
  Quick-Scoring Mental Ability Test. (*See* Tests, intelligence.)
  Self-Administering Test of Mental Ability. (*See* Tests, intelligence.)
Otterbein College, film-text method of teaching French at, 254
Outterson Mid-term Physics Test. (*See* Tests, physics.)

P

Pacific Union College, 259
Pacing of lessons. (*See* Lessons, pacing.)
Panel discussions. (*See* Discussion.)
Parallel-form posttest, 124, 157
Participation, student, 1, 16, 43, 58, 63, 81, 104, 105, 106, 109, 110, 122, 126, 150, 162, 165, 166, 168, 169, 181, 184. 187, 199, 207, 220, 270, 276, 293, 313, 321. (*See also* Instructor, participation.)
Peer instruction, 43, 108, 178, 251
Pennsylvania:
  Philadelphia public schools, 325, 326
  Pittsburgh schools, 104, 126
  Schools, 47, 74, 102, 105, 106, 108, 132, 307, 308
  State English Placement Test. (*See* Tests, English.)
  State University, 40, 41, 101, 103, 118, 119, 132, 150, 167, 224, 233, 234, 247, 264, 282
Perception, effect of ITV on student, 99, 170, 171, 200
Performance and learning, 29, 100, 108, 129, 159, 175, 177, 187, 202, 206, 222, 236, 269, 278, 279, 280, 330. (*See also* Practice; Tests, performance.)
Personality, 65, 79, 81, 112, 178, 205, 283. (*See also* Tests, personality and character.)
Pintner-Durost General Ability Test. (*See* Tests, intelligence.)
Posttest. (*See* Tests, pre- and posttests.)
Practice, 12, 13, 91, 97, 113, 120, 122, 123, 159, 165, 203, 207, 273, 307. (*See also* Repetition.)
Pretests. (*See* Tests, pre- and posttests.)
Primary Mental Abilities Test. (*See* Tests, intelligence.)
Printed communication, 79, 93, 101, 109, 119, 129, 150, 174, 176, 193, 194, 229, 254, 265, 296, 301, 307, 328
Prison, ITV lessons for inmates of state, 179
Problem solving, 63, 116, 129, 158, 247
Problem-solving tests. (*See* Tests, problem-solving.)
Proctors, use of. (*See* Instructor, prestige; graduate assistants, use of.)
Production, factors in, 12, 15, 17, 18, 36, 50, 73, 76, 168, 204, 224, 230, 245, 249, 261. (*See also* Visualization.)
Professional Aptitude Test. (*See* Tests, intelligence.)
Profiles of subjective ratings. (*See* Ratings.)
Programed learning, 80, 101, 104, 105, 106, 122, 157, 174, 209, 282, 312, 316. (*See also* Response.)
Projection:
  Multi-view, 129
  Orthogonal, 180
Projector. (*See* Screen.)
Projects, student, 10, 63, 169, 270
Pronunciation, 3, 51, 91, 109, 121. (*See also* Speech.)
Purdue:
  English Training Test. (*See* Tests, English.)
  Instructional Television Attitude Scale. (*See* Tests, Attitude.)
  Mathematics Training Test. (*See* Tests, mathematics.)
  Rating Scale for Instruction. (*See* Tests, attitude.)
  Scale for Measuring Attitude Toward Any School Subject. (*See* Tests, attitude.)
  University, 160, 245, 266, 267, 268, 298
Pushbutton tests. (*See* Tests, pushbutton.)

Q

Q-sort, 87
Questionnaire, 6, 10, 18, 20, 23, 24, 32, 38, 54, 55, 61, 65, 72, 85, 86, 93, 97, 110, 198, 294. (*See also* Tests, attitude.)

R

Race, 51, 95, 148, 291, 303
Radio, comparative effectiveness of ITV and, 19, 91, 319, 320, 328
Random assignment, 2, 4, 10, 14, 18, 24, 40, 41, 51, 54, 55, 58, 66, 69, 70, 86, 88, 89, 91, 93, 99, 101, 102, 103, 131, 145, 146, 147, 176, 187, 198, 215, 233, 262, 282, 288, 294, 295, 298, 305, 312, 313, 316, 319, 320, 323, 332, 333. (*See also* Stratified random assignment.)
Random selection, 51, 110, 114, 279
Rank of groups, 40, 102, 140, 167, 196, 200, 220, 309
Ratings, 3, 48, 51, 95, 96, 115, 136, 147, 159, 187, 196, 202, 206, 217, 251, 262, 267, 279, 301, 305. (*See also* Instructor, rating.)
Readability formulas, 211, 223
Read General Science Test. (*See* Tests, science.)
Reading, 3, 8, 24, 25, 33, 39, 48, 61, 65, 69, 91, 94, 106, 126, 132, 161, 176, 182, 187, 193, 194, 228, 229, 271, 279, 287, 303, 331
  Readiness, relation to film learning, 228, 279
  Remedial, 96

Rear projection, 15, 16
Recall, stimulated, used in ITV course, 114, 193, 213, 224, 313, 317. (*See also* Retention.)
Regression. (*See* Correlation, multiple.)
Rensselaer Polytechnic Institute, 129, 300
Repetition, 14, 16, 52, 98, 118, 122, 123, 162, 164, 177, 198, 201, 223, 237, 272. (*See also* Viewings, number of; Practice; Review.)
Responses:
  Devices for. (*See* Tests, pushbutton.)
  Overt-covert, 43, 101, 104, 105, 106, 120, 162, 165, 181, 207, 282
  Reading. (*See* Reading.)
Retarded students, 43, 67, 68, 143
Retention, 10, 18, 22, 26, 28, 31, 41, 45, 47, 49, 52, 53, 55, 58, 73, 76, 86, 88, 95, 100, 104, 105, 109, 114, 127, 131, 135, 149, 150, 151, 154, 155, 157, 162, 170, 172, 183, 206, 213, 215, 221, 224, 231, 234, 237, 246, 250, 252, 257, 258, 269, 272, 275, 288, 306, 308, 312, 319, 320, 328, 332
Review, 14, 117, 140, 152, 162, 181, 189, 208. (*See also* Repetition.)
Rigidity, viewer, 17, 79, 205
Robinson-Hall Test of Reading Ability for History. (*See* Tests, history.)
Rokeach Dogmatism Scale. (*See* Tests, personality and character.)
Role:
  Playing, 115, 178
  Prestige, 167
Rosenzweig Picture-Frustration Study. (*See* Tests, attitude.)
Ryan Observation Scale, 302

S

Salience, test of, 205
San Francisco State College, 65, 179
San Jose State College, 251
School:
  And College Ability Tests. (*See* Tests, intelligence.)
  Size of, 5, 61, 141, 219, 225, 228
  Years of, 21, 80, 140, 141, 161, 196, 201, 289, 321
Science:
  Goals, 10, 128, 261
  New media for teaching, 302
  Reasoning, 63, 287
  Research Associates Language Comprehension Test. (*See* Tests, language.)
  Vocabulary scores, 10, 211
Scientific attitude, developing, 58, 161, 287
Screen:
  Angle from, 15, 121
  Distance from, 15, 16, 41, 103, 121, 122, 298
  Large TV, 103, 247
Self-concept, 62, 81, 147, 179, 275, 278, 302
Self-insight scales. (*See* Tests, personality and character.)
Semantic differential scaling, 17, 21, 30, 79, 81, 82, 87, 172, 173, 206, 214, 216, 220, 267, 275, 301, 322, 323
Sequential Tests of Educational Progress. (*See* Tests, mathematics, science, social studies.)
Sets, learning, 133, 134, 140
Seventh-grade courses. (*See* Courses and subjects, grade, seventh.)
Sex, 10, 11, 18, 32, 41, 47, 70, 80, 91, 96, 108, 109, 112, 115, 128, 146, 148, 157, 158, 161, 169, 176, 178, 182, 184, 192, 193, 194, 196, 215, 239, 251, 257, 259, 267, 270, 278, 285, 286, 302, 303, 308, 327
Shaycoft Plane Geometry Test. (*See* Tests, mathematics.)
Sims Social Class Identification Occupation Rating Scale. (*See* Tests, sociological.)
Sixth-grade courses. (*See* Courses and subjects, grade, sixth.)
Sizing Up Your School Subjects test. (*See* Tests, attitude.)
Slides, 71, 89, 100, 109, 150, 252, 306, 316. (*See also* Filmstrip.)
Society of Motion Picture and Television Engineers, viewing standards of, 15
Socioeconomic status, 97, 125, 148, 157, 178, 213, 228, 236, 291
Sociogram, 139
Sociometric tests. (*See* Tests, sociometric.)
Space perception, use of films for, 129
Spanish skills. (*See* Courses and subjects, by grade level.)
Speech, 96, 121, 123, 138, 139, 146, 195, 196, 275. (*See also* Pronunciation; Courses and subjects, by grade level.)
Spelling:
  Learn to Spell series, 241
  Tests. (*See* Tests, spelling.)
  See also Courses and subjects, by grade level.)
Stanford:
  Achievement Test. (*See* Tests, intelligence.)
  Binet test. (*See* Tests, intelligence.)
  University, 127
Stoddard plan organization, 255
Stratified random assignment, 319, 328
Student:
  And teacher contact, 78, 107, 124, 125, 136, 171, 184, 186, 191, 203, 238, 260, 266, 281, 285, 286
  Education. (*See* School, years of.)
  Involvement, 55, 68
  Matched. (*See* Matched subjects.)
  Random assignment. (*See* Random assignment; Random selection.)
  (*See also* Attitude, student; Projects, student; Ratings; Training.)
Study:
  Additional, after course, 47, 55, 108, 301
  Guides. (*See* Lesson guides.)
  Habits, 33, 41, 69, 113, 122, 225, 255, 296
  Time, 98, 174
Subjects and courses. (*See* Courses and subjects, by grade level.)
Summer courses, open-circuit ITV used in, 124
Superimpositions. (*See* Production; Visualization.)
Syracuse University, 216

T

Tachistoscope manual, Keystone, 94, 189
Talkback, 8, 23, 38, 41, 173, 189, 245, 247, 249, 266, 271, 281, 293, 300, 332. (*See also* Feedback.)
Tape recorders, use of. (*See* Audio.)
Taylor Manifest Anxiety Scale. (*See* Tests, personality and character.)
Teacher. (*See* Instructor.)
Teaching:
  Effectiveness, 20, 136, 237
  Followup. (*See* Practice.)
  Machines, used in programed course. (*See* Programed learning.)
  Mass teaching, cost of, 5
  Method-instructor interaction, 57
  Methods. (*See* Courses and subjects, college level, education; Discussion; Interview; Lecture.)
Techniques of, 122, 136, 251
Television, Intensive, 151, 155, 213, 286
Tenth-grade courses. (*See* Courses and subjects, grade, tenth.)
Tenth-Year Mathematics Regents Tests. (*See* Tests, mathematics.)
Terman-McNemar Test of Mental Ability. (*See* Tests, intelligence.)
Tests:
  Achievement. (*See* Achievement; *also* Tests, intelligence.)
  Algebra:
    Blyth Second-Year Algebra, 13
    California Algebra Aptitude, 318
    Cooperative Algebra, 318
    Garman-Schrammel Algebra, 13
    Lankton First-Year Algebra, 301
    Test mentioned, 324. (*See also* Courses and subjects, by grade level.)
  Aptitude. (*See* Tests, intelligence.)
  Aptitude, mechanical:
    Army Mechanical Aptitude, 253
    Tests mentioned, 10, 224, 279, 280. (*See also* Tests, performance.)
  Art:
    Choice of Picture, 202
    Graves Design Judgment, 202
    Problem, 295
  Attitude:
    Allen Attitude, 327
    Allport-Vernon Study of Values, 79
    Guttman attitude scaling, 102
    Likert attitude scaling. (*See* Likert scaling.)
    Minnesota Teacher Attitude Inventory, 44, 60, 66, 70, 89, 217, 218, 257, 285, 299, 302
    Northwestern University Interest Inventory, 331
    Purdue Instructional Television Attitude Scale, 160, 267, 268
    Purdue Rating Scale for Instruction, 220
    Purdue Scale for Measuring Attitudes Toward Any School Subject, 244
    Scale of Social Values, 205
    Sizing Up Your School Subjects, 61
    Tests mentioned, 6, 10, 23, 32, 34, 47, 50, 55, 58, 61, 66, 70, 72, 78, 87, 92, 108, 142, 144, 166, 167, 190, 191, 192, 198, 199, 214, 217, 218, 220, 231, 234, 237, 244, 248, 250, 260, 261, 270, 280, 282, 283, 293, 294, 297, 300, 304, 309, 311, 313, 314, 317, 321, 322, 324, 329, 331
    Thurstone-type scaling, 58, 167, 190, 191, 192, 244, 309
    University Image, 21
  Biology:
    Cooperative Biology, 55, 142
    Nelson Biology, 12
    Test mentioned, 210. (*See also* Courses and subjects, by grade level.)
  Chemistry:
    American Chemical Society-National Science Teachers Association Cooperative Chemistry, 34, 128
    Anderson Chemistry Achievement, 128, 303
    Cooperative Chemistry, 244, 258
    Test mentioned, 221. (*See also* Courses and subjects, by grade level.)
  Dental morphology, 29
  Economics:
    Hills Economics, 65
  English:
    Cooperative English, 35, 65, 168, 191, 192, 211
    Cooperative Test of Literary Comprehension, 168
    Essay, 23, 24, 33, 35, 117, 125, 168, 184, 192, 216, 233, 267, 290
    Freshman Orientation English, 267
    Pennsylvania State English Placement, 282
    Purdue English Training, 267
    Tests mentioned, 51, 193, 210, 267. (*See also* Courses and subjects, by grade level.)
    Vocabulary test. (*See* Tests, vocabulary.)
  Film tests, 42, 99, 138, 204
  French:
    Educational Testing Service Cooperative French Listening, 254
    (*See also* Courses and subjects, by grade level.)
  Handwriting scales, 235
  History:
    Cummings World History, 239
    Robinson-Hall Test for Reading Ability in History, 94
    Test mentioned, 211. (*See also* Courses and subjects, by grade level.)
  Identification, 176
  Industrial Arts:
    Manipulative Industrial Arts, 177
  Intelligence:
    American Council on Education Psychological Examination for College Freshmen, 65, 124, 135, 160, 172, 173, 184, 190, 191, 192, 223, 232, 277, 283, 285
    Armed Forces Qualification, 152
    Army General Classification, 137, 140, 154, 253
    California Achievement, 73, 120

  California Test of Mental Maturity, 5, 11, 95, 96, 157, 182, 221, 277, 307, 308, 319, 320, 332
  College Qualification, 164, 251
  Common Entrance Examination, 53
  Critical thinking, 190, 192, 210, 259, 287
  Detroit Alpha Intelligence, 239
  Detroit Tests of Learning Aptitude, 239
  Differential Aptitude, 259
  Greene-Stapp Language Ability, 125
  Guilford-Zimmerman Aptitude Survey, 246
  Henmon-Nelson Test of Mental Ability, 257, 318
  Iowa Test of Basic Skills, Form II, 8, 39, 125, 271
  Kuhlmann-Anderson Test of Mental Ability, 55, 139, 182, 215, 331
  Lorge-Thorndike Non-Verbal Intelligence, 54, 174, 177
  Metropolitan Achievement, 97
  Miller Analogies, 2, 99, 299
  Minnesota Scholastic Aptitude, 286
  Modern School Achievement, 149
  Moore Castore, 103
  Multiple Aptitude, 92
  Navy General Classification, 133, 134, 204, 227, 288
  New York State Regents, 8
  Ohio State Psychological Examination, 158, 202, 248, 254, 285
  Otis Intelligence, 75, 102, 200
  Otis Quick-Scoring Mental Ability, 186, 244, 258, 263, 291
  Otis Self-Administering Test of Mental Ability, 204
  Pintner-Durost General Ability, 97
  Primary Mental Abilities, 283
  Professional Aptitude, 316
  School and College Ability, 41, 61, 65, 89, 101, 128, 145, 179, 210, 284, 316, 324
  Sequential Tests of Educational Progress, 85, 145
  Stanford Achievement, 121, 123
  Stanford-Binet, 43
  Terman-McNemar Test of Mental Ability, 12
  Tests mentioned, 9, 10, 25, 37, 47, 63, 91, 115, 120, 125, 126, 138, 170, 190, 192, 198, 210, 259, 287, 294
  U. S. Armed Forces Institute Subject Examination, 5, 145
  Watson-Glaser Critical Thinking Appraisal, 92
  Wechsler Adult Intelligence Scale, 79
Language:
  Science Research Associates Language Comprehension, 139
  Tests mentioned, 126, 157, 210
Listening tests. (*See* Tests, speech.)
Matching, 114, 146
Mathematics:
  Cooperative Mathematics Placement, 191, 192, 318
  Davis Test of Functional Competence in Mathematics, 174
  Educational Testing Service Cooperative Test, Plane Trigonometry, 25
  Metropolitan Intermediate Arithmetic Achievement, 55, 143
  Ohio State University Mathematics Placement, 166
  Purdue Mathematics Training, 72
  Sequential Tests of Educational Progress, Mathematics, 54, 59, 61
  Shaycoft Plane Geometry, 92
  Stanford Achievement Test in Advanced Arithmetic, 11
  Stanford Achievement Test in Intermediate Arithmetic, 55, 143
  Tenth-Year Mathematics Regents, 92
  Tests mentioned, 59, 126, 210, 259. (*See also* Tests, algebra.)
Midterm, 2, 30, 41, 77, 80, 101, 173, 184, 285
Performance, 15, 16, 42, 100, 130, 154, 159, 175, 176, 202, 206, 236, 262, 269, 273, 279, 280, 289
Multiple-choice, 1, 6, 10, 18, 27, 31, 41, 42, 45, 55, 61, 86, 91, 102, 134, 137, 146, 149, 152, 154, 158, 167, 169, 170, 200, 206, 216, 223, 224, 233, 249, 250, 253, 257, 269, 287, 290, 292, 296, 297, 298, 300, 308, 316, 319, 323, 328, 333
Observation, 132, 218, 262, 302
Oral tests. (*See* Tests, speech.)
Objective tests, use of, 13, 117
Personality and character:
  Anxiety inventory, 7, 234, 257
  Aspiration inventory, biographical, 61
  Bernreuter Personality Inventory, 283
  Bills-Vance-McLean Index of Adjustment and Values, 65
  California Mental Maturity Index, 210
  California Personality Inventory, 285
  California Psychological Inventory, 205
  California Test of Personality, 178
  Edwards Personality Preference Schedule, 65, 79
  F-scale, 79
  Horrocks and Troyer Tests of Human Growth and Development, 2
  Inventory of Beliefs, 41
  Kuder Preference Record, Vocational, 317
  Minnesota Multiphasic Personality Inventory, 257
  Mooney Problem Check List, 178
  Rokeach Dogmatism Scale, 17
  Rosenzweig Picture-Frustration, 79
  Self-insight, 65
  Study of Values, 79
  Taylor Manifest Anxiety Scale, 79
  Tests in Human Growth and Development, 2
  Tests mentioned, 81, 97, 112, 178, 204
  Thematic Apperception, 79
  Wesley Rigidity Scale, 79
  Wood Behavior Preference Record, 220
Physics:
  College Entrance Examination Board, Physics, 118

  Cooperative Physics, 244, 258
  Dunning Physics Achievement, 291
  Iowa Physics Aptitude Examination, 291
  Ohio Every Pupil Physics, 34
  Outterson Mid-term Physics, 291
  Tests mentioned, 75, 219. (*See also* Courses and subjects, by grade level.)
Physiological, 22
Pictorial, 43, 63, 67, 119, 152, 153, 154, 162, 170, 202, 223, 287, 308, 323
Posttests, delayed. (*See* Retention.)
Pre- and posttest, 2, 27, 28, 31, 33, 37, 42, 45, 47, 48, 53, 58, 60, 63, 65, 66, 67, 68, 70, 72, 73, 74, 85, 89, 92, 95, 96, 102, 108, 115, 124, 125, 127, 128, 131, 134, 139, 140, 141, 142, 148, 149, 157, 158, 159, 165, 170, 178, 180, 183, 192, 197, 199, 200, 201, 202, 203, 205, 208, 214, 216, 228, 231, 233, 237, 239, 249, 250, 252, 272, 278, 280, 282, 288, 290, 294, 301, 306, 310, 312, 317, 327, 330
Problem-solving, 41, 43, 60, 63, 86, 116, 138, 158, 180, 190, 192, 247, 295
Pushbutton, 22, 73, 305, 329, 332
Reading:
  California Reading, 193, 331
  Diagnostic Reading, 33
  Iowa Silent Reading, 94, 194
  Metropolitan Achievement Test, Reading, 235
  Tests mentioned, 24, 25, 33, 39, 91, 126, 182, 324
Science:
  Attitude, 10
  California Test, 141
  Calvert Science Information, 307
  Cooperative General Science, 47
  Developed Abilities in Science, 41
  Facts About Science, 61, 142, 327
  Read General Science, 34, 125
  Science reasoning, 63, 287
  Science vocabulary, 10
  Sequential Tests of Educational Progress, Science, 54, 55, 61, 85, 239
  Test of Developed Abilities in Science, 41
  Tests mentioned, 10, 76, 141, 169, 210, 211
Situation. (*See* Tests, problem-solving.)
Social sciences:
  California Test of Social Sciences, 141
  Sequential Tests of Educational Progress, Social Studies, 145
  U. S. Armed Forces Institute Civics Test, 145
  (*See also* Courses and subjects, by grade level.)
Sociological:
  Sims Social Class Identification Occupation Rating Scale, 89, 178
  Tests mentioned, 139, 157, 178, 204, 231, 316
  Sociometric test, 65, 110
Spanish:
  Educational Testing Service Cooperative Spanish, 284
  (*See also* Courses and subjects, by grade level.)
Speech:
  Auding test, 65, 195
  Audiovox Audiometric, 139
  Auditory memory span, 139
  Brown-Carlsen Listening Comprehension, 24, 146
  Bryngelson and Glaspey Picture Articulation, 139
  Bryngelson and Glaspey Speech Improvement, 95
  Listening, 24, 33, 41, 91, 120, 121, 123, 238, 239, 254
  Tests mentioned, 24, 67, 97, 139
Spelling, 210, 241
Synthesis, 190, 192
Teaching aptitude, 316
True-false, 6, 48, 134, 140, 146
Verbal. (*See* Tests, intelligence.)
Writing. (*See* Tests, essay.)
Vocabulary, 10, 24, 169, 210, 211, 252, 269
Testing:
  Effect of, 1, 264, 288
  Frequency of, 11
  Scientific terminology, 14
Texas:
  Dallas public schools, 59
  University of, 59
Textbook use, 41, 129, 254, 265. (*See also* Printed communication.)
Thematic Apperception Test. (*See* Tests, personality and character.)
Third-grade courses. (*See* Courses and subjects, grade, third.)
Thurstone attitude scaling. (*See* Tests, attitude.)
Time:
  Class, 186, 194, 218
  Instruction, 20, 273
  ITV class, 10, 63, 155, 270
  Laboratory work, 29, 100, 269
  Of ITV portion of lesson, 10, 169
  Presentation, 16
  Reduction in, 19
  Testing, 1, 15, 16, 52, 102, 200, 259
  Viewing, 52, 273
Toronto, University of, 328
Training presentations, 64, 71, 84, 86, 152, 153, 154, 155, 165, 188, 198, 208, 249, 250, 253, 272. (*See also* Performance.)
t-test, 8, 29, 37, 41, 50, 55, 59, 62, 65, 73, 77, 82, 87, 100, 105, 107, 115, 119, 127, 131, 139, 141, 145, 149, 155, 157, 161, 167, 168, 170, 172, 173, 180, 184, 186, 190, 191, 192, 198, 216, 229, 233, 239, 241, 248, 267, 268, 272, 278, 285, 286, 291, 296, 306, 309, 312, 316, 324, 328, 330
Twelfth-grade courses. (*See* Courses and subjects, grade, twelfth.)

U

U. S. Armed Forces Institute Subject Examination. (*See* Tests, intelligence.)
University studies and courses. (*See* Courses and subjects, college-level.)

Utah:
  Mentioned, 225
  University of, 45, 98
Utilization. (*See* Discussion; Lesson guide; Instructor training.)

V

Variance of students' scores over time, 12, 41, 53, 149
Video only, 308
Videotape. (*See* Film; *also* Kinescope.)
Viewers:
  Casual, 213, 270
  Intermittent, 209
  Location, 121, 141, 144. (*See also* Screen, angle from; Screen, distance from.)
  Number of, 45
  Off-campus, 1, 65, 77, 98, 135, 149, 152, 171, 179, 203, 213, 292
  Patterns, 144, 161, 182
  Room conditions, 15, 16, 103, 155, 225, 304
Viewings, number of, 25, 44, 45, 52, 68, 98, 118, 122, 123, 127, 154, 162, 164, 201, 209, 272, 288, 298, 306
Virginia:
  Norfolk schools, 148, 315
  University of, 37, 131, 196
Visits, 34, 59, 61, 85, 93, 99, 217, 218, 262
Visualization, 18, 36, 41, 50, 57, 65, 66, 129, 138, 139, 155, 160, 168, 175, 176, 178, 184, 223, 224, 245, 263, 269, 272, 285, 306
Vocabulary, learning and retention of, 3, 8, 10, 24, 51, 109, 114, 150, 169, 182, 211, 215, 252, 269, 284
Vocational schools, ITV courses given in, 294

W

Warner scale, 157
Washington:
  County. (*See* Maryland, Washington county.)
  Square College of New York University, 35
  State University, 57
Watson-Glaser Critical Thinking Appraisal. (*See* Tests, intelligence.)
Wayne State University, 73
Wechsler Adult Intelligence Scale. (*See* Tests, intelligence.)
Wesley Rigidity Scale. (*See* Tests, personality and character.)
West Virginia Department of Education, 327
Wilcoxon sign rank test, 259
Wisconsin:
  Schools in, 209, 252, 265, 294, 319, 320, 321, 322, 330
  University of, 117, 138, 252, 320, 321, 323, 329
Wood Behavior Preference Record. (*See* Tests, personality and character.)
Wooster College (Ohio), 254
Workbooks, 33, 41, 106, 129
Workshops, 93, 115

Y

Years in school. (*See* School, years in.)

Z

z test, 170

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